Creating and Applying a Cognitive Change Model: A Transdisciplinary (Education, Cognitive Psychology, Neuroscience) Approach

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Dedication

This dissertation is dedicated to the teachers in the Wisconsin Evangelical Lutheran Synod whose passion and faith are the engine that drives our Lutheran school system. It is their servant-like attitude, continual desire for excellence, and zeal for continuing education that have inspired me on this quest to unlock the secrets of educator cognitive change.

Abstract

This study uses qualitative data and literature from various disciplines to shed light on the complex phenomenon of cognitive change, especially as it occurs within educators. The resulting understandings are used to develop both verbal and visual models to illustrate the dynamics of such a transformative mental change. The qualitative data represents reflections of individual participants in a collaborative leadership problem-solving virtual environment designed to elicit cognitive conflict and potentially resulting in new understandings about power. This data was analyzed iteratively with research and literature from education, cognitive psychology, and neuroscience to gain a complete picture of cognitive change from an individual perspective. The study tests the cognitive change model's usefulness by applying it to individual participants' experiences.

Table of Contents

List of Tables

List of Figures[1]

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[1] All figures are created by this proposal's author and are drawn from numerous neuroscience study reports and syntheses, especially works by Bechara & Damasio (2005), Blakemore & Frith (2005), Egner (2009), Lieberman (2010), Mohanty et al. (2007), Ochsner & Gross (2003), Summerfield & Egner (2009), and Summerfield et al. (2006).

Prologue

My first experience providing instruction to educators was in 1995. I shared my constructivist-type approach to teaching middle school social studies with educators at a conference. My instruction emphasized the teacher's role, and the guidance s/he must provide to ensure student productivity in a student-centered approach. Afterwards, most politely thanked me, but a few enthusiastic educators wanted to know more. I provided further advice and resources for those few to set up their own classrooms using my model. About a year later, I contacted the educators to offer more assistance. None had persisted. One reported borrowing some ideas as part of his regular instructional approach, and another tried, but abandoned the model sharing, "It didn't work with my students." Further inquiry revealed the educator had not incorporated key practices for instructor guidance.

That experience has haunted me ever since. Why did other educators not understand the instructional approach? Why did most reject it as impractical? How could excellent educators distort the approach by grafting it onto an epistemologically incompatible foundation? These questions led me to examine the research literature about cognitive change—first in education and later in neuroscience—for answers. My search for answers inspired this dissertation.

CHAPTER ONE:

INTRODUCTION

An old dog will learn no tricks.

- Nathan Bailey, 1721

This well-known proverb expresses that adults find it difficult or impossible to change their ways of thinking or adjust to new ideas. Brilliant minds have examined the phenomenon of cognitive change in the context of organizations, leadership, education, and psychology. Despite this focused attention, there is little consensus regarding how to achieve such change in adults except that it requires intensive time, training, reflection, collaboration, and motivation. Even with all of these requirements in place, the intended change may not occur.

This introductory chapter prepares the reader to understand the need for a study of cognitive change in the area of educator development. The chapter includes the following major sections: 1) Background of the Study; 2) Statement of the Problem; 3) Research Purpose and Questions; 4) Significance of the Study; 5) Definition of Terms; 6) Limitations and Delimitations; and 7) Organization of the Dissertation.

Background of the Study

The need to encourage adult cognitive change is highlighted by an increasingly global, competitive, and changing society. The growing contact between people of vastly different experiences has heightened the awareness of how different worldviews influence thinking and action. These differences in experiences can, and often do, lead to misunderstanding, miscommunication, and conflict. As inconsistencies occur that challenge existing beliefs, the gap between what we believe and the reality we

experience increases. Unless individuals learn to adapt to a changing environment, they become ineffective to meet modern demands, and their organizations become irrelevant.

Educators, including educational leaders, find themselves at the center of these cultural dynamics. Their charge is to transmit the knowledge of a culture while at the same time preparing the next generation to successfully navigate a rapidly changing society. To accomplish this evolving task, educators themselves must undergo a transformation in the understanding of their role, and, in turn, create similar transformations in those they educate. Educator development is the vehicle to equip educators to lead such changes. Understanding cognitive change within the context of educator development is an important step in creating a system of education that prepares its students for the challenges of modern society.

The phenomenon of educator cognitive change has been well-documented in educational literature. The literature discusses educators' deep-seated beliefs that influence their practice (Delpit, 1988; Dewey, 1933; Fang, 1996; Pajares, 1992). These beliefs are the product of years of experience with classroom culture (Lortie, 1975; Mezirow, 1991; Richardson, 1990). Educator beliefs change rarely and with great difficulty, and when they do, the experience can be intensely emotional (Kennedy, 2005; Richardson, 1990). The transformation of an educator's beliefs and actions requires reflection (Dewey, 1933; York-Barr, Sommers, Ghere, & Montie, 2006), new practices (Ertmer, 2005; Guskey, 2002), and job-embedded training with opportunities for collaboration (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009).

The study of cognitive change is not unique to education. Rather, it is central to the work of researchers and theorists in a variety of fields and disciplines, including

leadership and organizations. In the field of education, Dewey (1933) considered why people prefer certain beliefs over others even if they are inaccurate, and he proposed how education can promote open and reflective thinking in students. Also in education, Mezirow (1991) described the process of cognitive change in adult education as a transformation in meaning perspectives. From a science perspective, Kuhn (1962) contemplated how scientists become encultured into a paradigm of thought that dictates to what they attend, the methods they use, and their predicted results. He noted in detail the factors that create inertia to resist change in the field and the processes by which those changes in thinking and practice eventually occur. From an organizational perspective, Barnard (1938) used economic theory to describe how to lead an organization and its individuals to change. Scholars within various fields have proposed change theories for organizations (Armenakis & Bedeian, 1999; Hage, 1999; Weick & Quinn, 1999), individuals (Cavanaugh & McGuire, 1994; Quinn, 1996), educators (Geijsel & Meijers, 2005; Pajares, 1992; Richardson, 1990), and leaders (Heifetz, 1994).

Understanding change is still elusive despite researchers' varied approaches. Some researchers have identified steps in the process of change (Armenakis & Bedeian, 1999; Cavanaugh & McGuire, 1994; Quinn, 1996). Others were more concerned with studying the conditions that foster or inhibit change (Barnard, 1938; Duke, 1993; Hage, 1999; Seashore-Louis, 1998; Weick & Quinn, 1999; Wheatley, 1999). Still others have theorized about the mental constructs which give rise to cognitive change (Bandura, 1993; Dewey, 1933; Mezirow, 1991). However, the study of cognitive change has been limited thus far to examining the *behaviors* with which it is associated and *speculating*

on the mental processes which give rise to cognitive change through the use of response times, psychological tests, questionnaire-type measurement tools, and qualitative data.

Researchers have only recently obtained the tools and methods available to allow one to examine the mental processes that underlie human cognition (Geake & Cooper, 2003). Neuroscientists use a combination of behavioral data, functional magnetic resonance imaging (fMRI), and electroencephalographic (EEG) records to measure what is happening inside the brain. Whereas fifteen years ago studies in cognitive neuroscience were few, scattered, and gave rise to "neuromyths" (Goswami, 2006, p. 2), the exponential explosion of studies in the past decade allows for an accumulation of overlapping studies that "suggest new divisions and commonalities between processes that might not have been obvious from other behavioral and self-report methods" (Lieberman, 2010, p. 149).

While Kuhn (1962) pointed out that the introduction of new scientific instruments supplies researchers with new data to enable scientific theory to advance, he also warned that loyalty to existing theory inhibits free exploration. In a similar way, education researchers today have the tools to see what occurs within the mind and consider how that new knowledge can enlighten the understanding of cognitive change. Yet, the potential that neuroscience has for unpacking the nature of cognitive change has been largely unexplored—and often resisted—in education.

Statement of the Problem

Cognitive change is a complex human phenomenon that involves both biological and cultural influences. Cognitive change is not merely a phenomenon that occurs in the mechanisms of the mind or in an environmental context. Lee (2010) wrote that human

phenomena occur at the intersection of physiology, environment, culture, and dispositions. She described these life influences as threads in a braid woven together. These threads must be considered together when trying to understand a human phenomenon, like educator cognitive change, in its entirety. She wrote,

> Our biology predisposes us in certain ways, but our participation in cultural practices and the accompanying stimulation within our physical environments influence the range of variation in how biological dispositions toward certain classes of behavior present themselves and in the meaning associated with them. (p. 645)

Lee (2010) highlighted a growing realization in research; solutions for understanding complex human phenomena require problem-focused cooperation among various research disciplines.

Educator cognitive change is an important topic in education, and it is complex (Darling-Hammond et al., 2009; Ertmer, 2005; Fairbanks et al., 2010; Guskey, 2002; Kennedy, 2005; Mezirow, 1991; Mezirow, Taylor, & Associates, 2009; Richardson, 1990). Despite abundant research, educator cognitive change remains a mystery, and encouraging it remains a stubborn, unsolved problem. Most studies in educator cognitive change utilize only an education perspective. Rather than offering new solutions, these single discipline studies tend to suggest *more* of what has been tried in the past—more reflection, more collaboration, more time, more application/job-embedding (Darling-Hammond et al., 2009; Yoon, Duncan, Lee, Scarloss, & Shapley, 2007; York-Barr et al., 2006). Since educator cognitive change involves both cultural and biological processes, a research approach to educator cognitive change that involves

education and neuroscience may provide new insight and suggest new solutions. However, several problems arise when attempting to study the issue from these two perspectives.

Each discipline is bounded by different philosophies, epistemologies, and accepted methodology, and they operate on different levels of complexity that are not immediately transferrable to one another (Samuels, 2009; Varma, McCandliss, & Schwartz, 2008; Willingham & Lloyd, 2007). Neuroscientists are concerned with *low-level*, cognitive constructs and isolating variables in artificial contexts using a common, precise vocabulary of cells, brain areas, and neurotransmitters. Educators theorize about *complex* educational constructs involving mediating and confounding variables in authentic contexts using an evolving, fluid vocabulary of behaviors, practices, and theories. Those in the hard sciences have looked down on educators as being only interested in "what works" and complaining that neuroscience research is irrelevant to practice. Yet when educators rushed to apply early neuroscience findings, they were then criticized for creating neuromyths (Bruer, 1997; Samuels, 2009). These differences between the disciplines result in misunderstanding and miscommunication and prevent them from collaborating on areas of common interest.

Working within their respective disciplines, education and neuroscience have developed their own vocabulary, couched in the language of accepted practice. Language both expresses and constrains one's understanding of the world (Mezirow, 1991). Disciplinary language, therefore, shapes the researcher or practitioner's understanding of and possible solutions to a problem. While a common, disciplinary language provides a means of clear communication for those within the discipline, it

can create barriers to communication with researchers and practitioners in other disciplines (Varma et al., 2008). Clearly, if integration of research across various disciplines is to be successful, a common language is required.

Researchers are increasingly calling for cooperative efforts between education and neuroscience because they recognize the potential for neuroscience to inform our conceptions of education and learning (Geake, 2005; Geake & Cooper, 2003; Goswami, 2006; Szucs & Goswami, 2007; Varma et al., 2008; Willingham & Lloyd, 2007). Varma et al. (2008) suggested that communication between educators and neuroscientists will improve if they collaboratively focus on the problem at hand rather than competition between disciplines. Samuels (2009) described such collaboration across disciplines as “transdisciplinary” (p. 49). A transdisciplinary approach to education and neuroscience requires common models using a shared vocabulary that educators can understand (Goswami, 2006; Samuels, 2009; Szucs & Goswami, 2007; Varma et al., 2008; Willingham & Lloyd, 2007). Through transdisciplinary models communicators can interpret neuroscience from the perspective and language of educators and feed educators’ future research ideas back to neuroscientists (Goswami, 2006).

Educators and neuroscientists have collaborated successfully around some educational problems. One ray of hope is in the study of dyslexia, a reading disorder. Using a cognitive model for phonological processing, researches have located neurological evidence of a phonological processing deficit. This finding helps educators identify targeted interventions for remediating the disorder (Varma et al., 2008; Willingham & Lloyd, 2007). Another sign that transdisciplinary approaches can suggest

solutions is found in math. Again, guided by cognitive theories, neuroscience studies have demonstrated that increased efficiency in the retrieval of simple math facts occurs when facts are retrieved by verbal processing areas rather than visual-spatial ones (Varma et al., 2008). This finding allows educators to select the best methods to teach simple math facts. While cooperative efforts between education and neuroscience have led to new understandings of educational problems, there currently exists no transdisciplinary model to enable these same disciplines to communicate with each other about the problem of educator cognitive change.

Research Purpose and Questions

In order to address the problem identified above, the twofold purpose of this exploratory qualitative dissertation is: 1) to gain a transdisciplinary understanding of educator cognitive change; and 2) to use that understanding to develop a model of educator cognitive change.

1. How might qualitative data be analyzed to capture observable phenomena associated with cognitive change?
2. How might an original model that incorporates education and neuroscience literature provide explanation for educator cognitive change?

Significance of the Study

The development of an educational and neuroscience transdisciplinary understanding of educator cognitive change and the use of it to create a model that can be applied to educator development settings is important for several reasons: 1) it provides a model for examining educator cognitive change when none currently exists; 2) it may provide a common communication tool to enable greater collaboration and

understanding around the issue of educator change between education and neuroscience; 3) it may prove to be a useful tool for clarifying factors that contribute to educator change, and 4) if successful, insight to the problem of educator cognitive change may suggest new solutions and approaches to educator development.

A new perspective regarding cognitive change for educators is timely because requests to pour limited resources into creating conditions which hope to prompt educator change are increasing. Educator change is often viewed as the conduit for creating the kinds of reform in education for which people are calling (Darling-Hammond et al., 2009; York-Barr et al., 2006). These calls for change in education are almost constant as those in education and politics debate, propose, and legislate the fad *du jour*. As university courses, conferences, and books increasingly highlight educator change, the growing consensus is that creating the conditions for such change to occur requires that educator development must be ongoing, intensive, collaborative, reflective, and job-embedded (Wei, Darling-Hammond et al., 2009; Yoon et al., 2007; York-Barr et al., 2006).

A collaborative, job-embedded approach toward educator development requires new policies, procedures and funding and represents a change in American education as to *how* such educator development should occur (Geijsel & Meijers, 2005). Such job-embedded, collaborative approaches lie in stark contrast to traditional approaches toward educator development and require policy changes that support the radical restructuring of American education. Such policy changes include new methods of induction, additional accountability, and additional opportunities to collaborate during the school day (Darling-Hammond et al., 2009). Also, outside institutions or agencies

that provide such professional growth services will need to restructure their long-used models for delivering such services (Jaquith, Mindich, Wei, & Darling-Hammond, 2010). These policy and procedural changes imply a significant impact on education's resources of time and money. A transdiciplinary analysis of educator cognitive change may lead to change theories that either justify such expenditures or suggest other, less costly, ways that such change in educational settings can be supported.

Definitions of Terms

The dynamics of human understanding and change have been studied in several fields by numerous researchers using a variety of terms. Terms such as gestalt, frames of reference, schemas, beliefs, paradigms, and ideologies overlap and have different meanings in various fields of study. The following important terms will be used as follows throughout this dissertation:

cognitive—Belonging to the mental processes that enable one to think, create meaning, understand, interpret, solve problems, and make predictions.

cognitive change—A phenomenon that results in the ability to think, create meaning, understand, solve problems, and make predictions in a way that was not previously possible. It occurs when one's meaning perspective or meaning schemes have shifted. It begins with a period of disorientation, proceeds through a period of reflection and search for meaning, and involves a moment of resolution. It results in a new understanding that views the old position or action as wrong and the new one as superior for understanding and action (Cavanaugh & McGuire, 1994; Dewey, 1933; Kennedy, 2005; Kuhn, 1962; Pajares, 1992; Richardson, 1990).

discipline—A field of study involving an area of knowledge having philosophies, epistemologies, and methodologies that govern the research conducted within its boundaries.

education—The field of study involved with understanding teaching and learning. For the purpose of this dissertation, it will be treated as a discipline just as neuroscience is considered a discipline. This approach is consistent with literature advocating cooperation between education and neuroscience (Geake, 2005; Geake & Cooper, 2003; Goswami, 2006; Lieberman, 2010; Samuels, 2009; Szucs & Goswami, 2007; Varma et al., 2008; Willingham & Lloyd, 2007).

educator –A person whose role involves making decisions which affect teaching and learning. Roles like teacher, administrator, special educator, and curriculum coordinator are included in the term "educator."

educator cognitive change—A phenomenon that results in an educator being able to think, create meaning, understand, solve problems, and make predictions in a way that was not previously possible.

educator development—Experiences that are designed to encourage individual cognitive change in educators. Educator development is used comprehensively for all forms of formal educator experiences, including workshops, in-services, and university courses.

experiential simulations (ES©)—This is a learning process used in connection with educator development. Participants work in a virtual environment while completing a problem-based learning task. During this process their identities

are masked, or disguised. Participants experience and describe moments of identity loss, confusion, and new understanding (Brunner, 2004).

meaning—A value or quality given to an object, word, action, or event based upon the combination of prior experience, language, cultural symbols, and the individual's interpretation of them.

meaning perspective—Personally constructed "habitual set of expectations that constitutes an orienting frame of reference that we use in projecting our symbolic models and that serves as a (usually tacit) belief system for interpreting and evaluating the meaning of experience" (Mezirow, 1991, p. 42). These meaning perspectives are the broad underlying system of beliefs by which we orient ourselves in our surroundings. It is the change in one's meaning perspective that is the cause of deep, personal, and often uncomfortable cognitive change.

meaning schemes—The "particular knowledge, beliefs, value judgments, and feelings that become articulated in an interpretation" and serve as "concrete manifestations" of meaning perspectives (Mezirow, 1991, p. 44). These meaning schemes are subsets of the meaning perspective. They are frequently updated and modified as one encounters new experiences that render old meaning schemes useless. Though a change in a meaning scheme can be enlightening, it is usually less traumatic and uncomfortable than a change in one's meaning perspective. An accumulation of adjustments to meaning schemes can become the basis for a deeper cognitive change in one's meaning perspective.

Paradigms—The aspects of meaning perspectives that are *shared by a group* of people. Kuhn (1962) used the term to describe a shared understanding of the nature and work of science. For him it consisted of the accepted laws, theories, and methods of investigation that shaped the collective consciousness of those within science and framed the questions they pursued. Although some use the term to describe the personal beliefs one holds (a sort of personal paradigm), it will be used exclusively here to refer to a commonly *shared* set of beliefs.

Transdisciplinary—An approach to research and problem solving that attempts a "holistic understanding" (Samuels, 2009, p. 49) of a common issue by collapsing knowledge from across the disciplines. Samuels defines transdisciplinary as "an approach to examining and solving complex problems through the collaborative efforts of multiple diverse partners" (p. 49). Within his approach the varied philosophies, epistemologies, and methodologies are respected and accommodated within a collaborative framework. The word "transdisciplinary" can describe research, theory, frameworks, or models.

Delimitations of the Study

My background is in education, and the bulk of my experience, prior to this study, was situated in the social sciences. The language of cognitive neuroscience is new to me. Neither the expertise nor the funding made it possible to access the tools of neuroscience. A transdisciplinary approach permits the researcher to operate from within her/his native discipline, yet venture into foreign disciplines and bring back knowledge useful for shedding light on the problem ((Varma, McCandliss, & Schwartz, 2008).

Organization of the Dissertation

Chapter Two outlines the theoretical literature and research studies that inform our understanding of human change and cognition. Chapter Three explains the methodological approach used in this exploratory research of cognitive change. The chapter describes the 1) qualitative approach used to collect data; 2) the process used to identify individual cases for further examination; and 3) the procedures used to analyze the qualitative data from the individual cases. Chapter Four answers the first research question by providing both an ideographic and a nomothetic analysis of the qualitative data from the selected individual cases. Chapter Five focuses on the second research question by creating a model of educator cognitive change and applying it to the individual cases. Chapter Six ends with conclusions, implications, and limitations.

CHAPTER TWO:

LITERATURE REVIEW

This review uses literature from various disciplines to discuss theories and studies that shed light on the topic of educator cognitive change. First, this chapter sets the overarching framework for this study by reviewing various approaches to transdisciplinary research between education and neuroscience. Second, I discuss what is known about change in education as it occurs collectively as a discipline and within its organizations. Change is brought to the individual level with a focus on the literature of teacher cognitive change. Third, cognitive change as it occurs *within* the individual educator is discussed through a review of neuroscience literature. Chapter Two concludes with a conceptual framework of educator cognitive change that is suggested by the literature. This chapter is organized into the following sections: 1) Trans-disciplinary Approach, 2) Education Perspective, 3) Neuroscience Perspective, and 4) Conceptual Framework: Transdisciplinary Perspective.

Transdisciplinary Approach

Increasingly, the research community is seeing the value of interdisciplinary collaborations to solve the riddles of complex phenomena like educator cognitive change. Researchers advocate a pragmatic approach that draws upon the knowledge of various disciplines to solve stubborn problems. They argue that a variety of epistemologies and methodological approaches contribute to holistic understanding (Lee, 2010; Lieberman, 2010; Teddlie & Tashakkori, 2009; Varma et al., 2008).

There are three common approaches to an interdisciplinary understanding of research (Samuels, 2009). One approach sees the research of one discipline as useful for

informing the research and practices of another. A second approach recognizes the need for disciplines to work together as partners using their respective theories, methods, and data to inform new lines of inquiry and research and create breakthroughs to stubborn problems. Proponents of this second approach call for the creation of new disciplines with names like educational neuroscience (Geake, 2005; Szucs & Goswami, 2007; Willingham & Lloyd, 2007) and social cognitive neuroscience (Lieberman, 2010). The third approach is a transdisciplinary one. Rather than form a new discipline, a transdisciplinary approach advances that each existing discipline should work to its strength within its own epistemology to produce knowledge that can be shared and used by other disciplines to form a complete picture (Samuels, 2009). Each of these approaches are discussed in the following sub-sections: 1) Informational, 2) Aggregate, and 3) Transdisciplinary.

Informational

The first approach sees neuroscience as useful for informing education. The National Research Council's book *How People Learn: Brain, Mind, Experience, and School* (Bransford, Brown, & Cocking, 2000) serves as an example of the first approach. The authors compiled research from cognitive, developmental, and social psychology together with neuroscience to provide a comprehensive look at how those disciplines can each inform education and learning. They contend that since the interaction between the child and environment affects both the brain and psychology, studies of both neuroscience and cognition are useful for informing education. In particular, chapter five applies neuroscience studies to education.

In their book *The Learning Brain: Lessons for Education,* Blakemore and Frith (2005) presented a synthesis of cognitive neuroscience research specifically couched in language for educators and suggested that cognitive psychologists may serve as a mediator between these two fields. They shared examples of how cognitive neuroscience has informed theory and practice in areas of educational deficiencies such as dyslexia and dyscalculia, and have additional suggestions for educational issues such as memory systems, visual and rote learning, and automaticity.

Geake and Cooper (2003) concluded that "caveats notwithstanding, there *are* implications and applications for education in cognitive neuroscience" (p. 17). However, they also point out that "over-simplifications of some neuroscience findings" (p. 13) have also led to educational neuromyths. To avoid difficulties such as misinterpretation and misuses of findings, a discipline like cognitive psychology can serve as a mediator to help an educational researcher understand the work of a cognitive neuroscientist (Goswami, 2006).

There are other limits to this first approach. Willingham and Lloyd (2007) pointed out that the levels of analysis within the various disciplines contain different complexities which do not map directly onto each other. For example, an *educational* construct like reading is comprised of several complex *cognitive* constructs, such as working memory, long-term memory, semantic mapping, and symbolic representation. In turn, the cognitive constructs utilize numerous, overlapping neural networks which may be situated in shared cortical regions. In this way, the levels of analysis needed for education and neuroscience are hierarchical, with educational constructs being much more complex than neural activity. Therefore neuroscience cannot directly inform most

behavioral effects because they are confounded by lower level interactions. It is good to remember "that, at least for some levels of analysis, the whole is more than the sum of the parts" (Willingham & Lloyd, 2007, p. 142). Despite the limitations, there can be value in allowing neuroscience to inform studies of cognition. In some cases, neural activity allows for a direct observation of an internal representation. Neuroscience can affirm the existence of cognitive constructs, distinguish between cognitive constructs that appear similar according to behavioral data, and provide support for cognitive theories (Lieberman, 2010).

Aggregate

A second, aggregate approach to interdisciplinary cooperation has led to the emergence of new research fields in the last decade. Examples of the new fields include educational neuroscience (Szucs & Goswami, 2007) and social cognitive neuroscience (Lieberman, 2010). In these new research fields, various disciplines work in concert with one another to bring their respective strengths to bear upon the research problem. Approach two is underscored by Willingham and Lloyd (2007), who asserted that because neural, cognitive and educational constructs represent differing levels of complexity, neuroscience can inform education only if it is "part of a broader approach to research in education, not the sole savior" (p. 147).

Szucs and Goswami (2007) define educational neuroscience as "the combination of cognitive neuroscience and behavioral methods to investigate the development of mental representations" (p. 114). This new field integrates the theoretical and methodological frameworks found in education, neuroscience, and cognitive psychology for the purpose of identifying meaningful relationships between

hypothetical cognitive processes and neural activity in ways that are useful to education. Such study requires a new breed of interdisciplinary researchers who are trained to understand the concerns, epistemologies, and methods of both educators and neuroscientists (Szucs & Goswami, 2007).

Social Cognitive Neuroscience had its beginnings as a field in 2001 (Lieberman, 2010). It merges the fields of social, cognitive, and neural research to gain a more complete understanding of human activity by considering the contexts, brain mechanisms, and the brain systems that support it (Ochsner & Lieberman, 2001). It "uses the tools of neuroscience to study the mental mechanisms that create, frame, regulate, and respond to our experience of the social world" (Lieberman, 2010, p. 143). Researchers in this field believe that aggregated brain mapping studies can suggest similarities and differences between mental processes that may not be possible by using behavioral or self-report methods alone.

Working within new disciplines like social cognitive neuroscience is difficult. Each discipline has a different history, and they have often been critical of each other. The philosophies and epistemologies underlying contributing disciplines bring with them different assumptions about reality and how it can be explored. There is a tendency in new interdisciplinary fields, such as educational neuroscience and social cognitive neuroscience to approach research through a neuroscience lens and have neuroscience dominate the conversation (Samuels, 2009). Samuels (2009) reminded researchers in these new fields that not everyone shares the same epistemologies, and that "treating differences as if they do not matter is either naïve or arrogant" (p. 49). For

that reason he advocates a third approach to cooperative research—a transdisciplinary approach.

Transdisciplinary

According to Samuels (2009) a transdisciplinary approach integrates "disciplines at the level of particular issues" (p. 46). A transdisciplinary approach creates an intellectual culture that respects the diverse research approaches, methods, and findings used to examine and solve complex problems. The researchers "apply their own particular expertise with the goal of reaching a holistic understanding of the issue" (p. 49). This diverse mix produces new insights that are greater than the sum of their parts. "Transdisciplinarity recognizes that the knowledge fragments created by one discipline often need to become integrated with the knowledge from other disciplines in order to have beneficial application to real-world problems and to more comprehensive theory development" (Samuels, 2009, p. 50).

A transdisciplinary approach holds promise for research breakthroughs in solving stubborn problems (Lee, 2010). Such breakthroughs can only be realized if those within various disciplines use their respective strengths to put the focus on the problem at hand (Varma et al., 2008). As Varma et al. (2008) concluded,

> When researchers identify themselves by the problems they study, then it is valuable to travel to foreign disciplines in search of new insights and to bring back souvenirs –new methods, data, and theories for answering the questions of one's native discipline. (p. 149)

Education Perspective

Managing educational change was the topic of the keynote address for the opening general session at the Association for Supervision and Curriculum Development (ASCD) annual conference in March 2011. Author Chip Heath (2010) stated that successful educational change requires an understanding of both the context of change and the process of change within the individual. Using Heath's suggestion, this section begins by reviewing the literature concerning the context of educator change within organizations and institutions. In education, paradigms are formed, conflict occurs, and new, collective meaning arises. Individual educators, however, become trapped within the larger educational context and struggle to take on new perspectives. Therefore, the following review explores what is known about educator cognitive change both 1) Organizationally and 2) Individually.

Organizationally

Kuhn (1962) introduced the concept of paradigms that frame people's thoughts and guide their behavior. While he explored his theories within the realm of science, he recognized that his view of a paradigm as a framework for interpreting the world could be applied more universally to other disciplines and even to concepts such as race or culture. His theories serve as a useful lens through which to interpret change within education as both an organization and a discipline. Additional insights are gleaned from organizational change literature. These insights are gathered under the following sub-headings: 1) Paradigms, 2) Conflict and disorientation, 3) Cognitive shifts, and 4) Summary.

Paradigms. Kuhn (1962) proposed that practitioners and researchers operate within accepted norms of what the world is like and how it should be studied. They become indoctrinated into the current paradigm through their educational experiences with textbooks, teachers, and peers. The prevailing paradigm allows those within the discipline to make decisions, define problems, and find solutions. However, the paradigm also traps thinking by establishing rules of acceptable practice. These rules guide the thoughts, observations, conclusions, research, and tools of the discipline and suggest expected solutions.

American education provides an interesting example of the dynamics of human change at the organizational level. Because the profession is strongly rooted in universally held, episodic memories, it is especially resistant to change and reform. Educators become encultured into an education paradigm. Educators begin learning their craft from the time they enter school by means of what Lortie (1975) refers to as "the apprenticeship of observation" (p. 61). Children spend an estimated 13,000 hours observing educators and learning the explicit and implicit rules of classroom life (Lortie, 1975). Despite the many observations, a student's understanding is limited to her own vantage point. A student cannot observe the theory, planning, and assessments that make up the behind-the-scene work of education (Fairbanks et al., 2010; Lortie, 1975). Many students go home and imitate what they see as they "play school" with siblings and friends. These experiences are selectively remembered as a series of episodic, first-hand accounts of what education should be (Fang, 1996).

These first-hand accounts lay the foundation for a common American education paradigm (Geijsel & Meijers, 2005). The norms and rules that guide acceptable

educational practice are often referred to as a “common sense” approach to instruction (Buchmann, 1987). This common sense approach is characterized by the “bright person model” (Fang, 1996, p. 50) that sees education as the delivery of information in which the educator’s job is to tell the students what to do. Guided by images of the past, it relies on impulse and intuition rather than reflection and knowledge (Pajares, 1992). Since all Americans share this background, parents, politicians, and lay people often consider themselves experts in determining the form that education should take, and they create environments of public opinion that are often hostile to changing the paradigm (Richardson, 1990).

This prevailing education paradigm can be characterized as a traditional approach (Geijsel & Meijers, 2005). This broadly accepted paradigm of education includes boundaries on how schools are structured, the role of administrators, how classes are taught, what learning looks like, and how student work is assessed. Little has happened to alter the traditional approach to education since the inception of the American common school, despite attempts to add new ideas from time to time. Tyack and Cuban (1995) outline the persistence of the traditional education paradigm.

> The basic grammar of schooling, like the shape of classrooms, has remained remarkably stable over the decades. Little has changed in the ways that schools divide time and space, classify students and allocate them to classrooms, splinter knowledge into ‘subjects,’ and award grades and ‘credits’ as evidence of learning. (p. 85)

When movements of reform are proposed, the traditional education paradigm exerts itself with calls for getting “back-to-basics.” For example, charter schools were

created in many states to free schools from regulation and bureaucracy so they could become “breeding grounds for teaching innovation” (Lemagie, 2009). Yet many charters adhere to traditional, graded classrooms, traditional curriculums, and school uniforms. After studying several charter school program evaluations, Hochschild and Scovronick (2003) declared that “when compared with traditional public schools, many charter schools seem unremarkable” (p. 121).

The traditional education paradigm allows education to filter new knowledge and focus attention on the goals of learning (Fairbanks et al., 2010). It allows for first-order changes that do not conflict with the traditional paradigm. Following a traditional paradigm also helps prevent fads. Elected officials and school reformers may exploit schools to gain media attention (Spring, 2005), but the traditional education paradigm helps school leaders buffer education from such forces (Tyack & Cuban, 1995). Conditions within the school such as accepted norms, collegiality, and the degree of instructional coordination also help to shield the educational system from harmful fads (Richardson, 1990).

Conflict and disorientation. According to Kuhn (1962) the presence of anomalies creates problems for the existing paradigm. Novel data may not be accommodated by making adjustments to theory or refining strategies. Although many will gloss over the occurrence of an anomaly as unimportant, some may explore it more closely and develop new tools to study it. It may become necessary for the paradigm to shift in order to accommodate the anomaly. The signals for a shift lead to a period of crisis in which the certainty of the current paradigm is jeopardized and past reputations are at stake. Kuhn describes the source of the resistance as the persistent belief that the

"old paradigm will ultimately solve all its problems" (Kuhn, 1962, pp. 150-151) if we force it enough.

Organizational change literature includes much that applies to educational organizations. This literature speaks of first-order changes as a continuous series of adaptations to the environment that result in larger change over time, but it also describes the need for equally important second-order changes, which are episodic and revolutionary (Van De Ven, 1995). Second-order changes require the replacement of one belief system with another (Weick & Quinn, 1999). Such change is required when inertia—due to past success and the reliance on previous experiences for future decision-making—causes the organization to change more slowly than its environment (Weick & Quinn, 1999). Environmental feedback signals a need for change, but those signals are often ignored until a triggering event or person calls them to attention. The change message creates a period of disequilibrium that precedes a resolution. Change messages are initially denied and resisted (Armenakis & Bedeian, 1999) until a change agent clearly identifies the discrepancy between reality and the ideal and guides the organization through the disequilibrium (Heifetz, 1994).

While a traditional approach to education represents the received paradigm, a second, competing paradigm has been promoted that is often referred to as constructivism (Geijsel & Meijers, 2005). Constructivism involves collaborative leadership and decision-making, student-centered instruction, depth of understanding, a relativist approach to knowledge construction, and an emphasis on intrinsic motivation and authentic assessments (Cuban, 1993; Jackson, 1986). To contend with the change in the United States' educational goals from "equal opportunity" to "equal outcomes,"

educator development frequently emphasizes a more constructivist approach to instruction (Danielson, 2007) and leadership (Heifetz, 1994; Wheatley, 1999) over the traditional approach. Despite academia's push for a move toward constructivism, these calls have been consistently resisted or misapplied in actual practice (Cuban, 1993; Jackson, 1986; Kennedy, 2005). Understanding traditional and constructivist educational frameworks in terms of Kuhn's (1962) competing paradigm helps to explain why educator development has difficulty enacting change in beliefs and practice.

Cognitive shifts. Kuhn (1962) suggested that eventually a new theory is proposed that provides greater understanding and leads to a gestalt enlightenment, or "aha" moment. The result is a paradigmatic revolution that enables the discipline to see the world in a new way. Though some within the discipline may persist in the former paradigm, the new paradigm provides a neater, simpler, and more suitable understanding.

In organizations like education, a change agent clearly identifies the discrepancy between reality and the ideal and guides the organization through the disequilibrium (Heifetz, 1994). An organizational environment can support change, increase the likelihood of acceptance and commitment, and foster the substitution of one belief system with another (Van De Ven, 1995; Weick & Quinn, 1999). Leaders seek to create fertile ground for promoting and sustaining change in organizations through incentives (Barnard, 1938), framing (Bolman & Deal, 2008), democracy (Bass, 1990; Pfeffer, 1981), and participation (Wheatley, 1999).

Summary. In organizations and disciplines like education, the literature speaks of change as a process. The process begins with the organization or discipline working within a shared paradigm that provides meaning and rationale for decision making (Dimaggio & Powell, 1983; Kuhn, 1962). On occasion, triggering events in the environment signal a need for an episodic, or second-order change to occur (Armenakis & Bedeian, 1999; Hage, 1999; Weick & Quinn, 1999). Although the names vary, change literature discusses stages through which an organization or displine proceeds. The first is one of conflict and resistance (Armenikis & Bedeian, 1999). The next is a period of rebalance in which the organization explores alternatives and adapts by learning new patterns of action (Armenikis & Bedeian, 1999; Weick & Quinn, 1999). The final stage is a period of commitment or resolution in which the old belief system is replaced by a new one (Van De Ven, 1995; Weick & Quinn, 1999).

Individually

The process of educational change within its discipline or organizations is the collective experience of individual educators. Those who study change at the individual level describe the process in a similar way as those who study change at the level of the organization. This literature review explores their description of individual cognitive change under the following sub-headings: 1) Meaning perspective, 2) Conflict and disorientation, and 3) Cognitive shifts, and 4) Summary.

Meaning perspective. Mezirow (1991) described human change as the process of transformative learning. A person constructs a meaning perspective through the conscious and unconscious interpretation of experiences. These meaning perspectives assist us in interpreting our individual experiences by focusing our attention on relevant

information and associating new experiences with prior ideas. Most often, a person uses her/his existing interpretations to make meaning of a new experience.

Individual cognitive change can be conceived as a shifting of one's meaning perspective. People prefer the safety and security of personal equilibrium and seek to avoid the pain and confusion associated with disequilibrium (Quinn, 1996). Each individual has a long-term store of knowledge and episodic memories that provides security for sense making in a complex world and becomes the basis for decision-making and identity (Geijsel & Meijers, 2005). This repertoire of solutions allows for quick decisions and a sense of equilibrium when the problems of daily life are encountered (Heifetz, 1994).

Mezirow (1991) made a distinction between meaning schemes and meaning perspectives, and that distinction is important to keep in mind with educator cognitive change. In the 1980's educators' beliefs became the focus of research. The impact of educators' beliefs on decision-making and programs of educator development was believed to be the key to addressing educational improvement in the United States (Fang, 1996). According to the literature on that topic, educators' beliefs affect their perceptions, judgments, behaviors, and decisions, and "can be the single most important construct in educational research" (Pajares, 1992, p. 329). Such beliefs are examples of Mezirow's (1991) *meaning schemes*.

Instead of describing an educator's meaning schemes as a collection of independent, one-dimensional entities, the literature refers to a framework or a system of beliefs (Fang, 1996; Pajares, 1992; Richardson, Anders, Tidwell, & Lloyd, 1991), or a *meaning perspective*. Included in this system are beliefs and theories about students

(Corbett, Wilson, & Williams, 2002; Delpit, 1988; Gay, 2010), subject matter (Shulman, 1986, 1987), the role of the teacher (Ertmer, 2005; Fang, 1996; Fishman, Marx, Best, & Tal, 2003; Richardson et al., 1991), and even the educator's own epistemology and self-efficacy (Bandura, 1993; Fairbanks et al., 2010; Guskey, 2002). The various types of meaning schemes the educator holds are interdependent and best studied as a system, rather than individually (Pajares, 1992). They provide an orientation for the educator to "make sense of the world" (Borg, 2001, p. 186).

Such a system of meaning schemes fits well with Mezirow's (1991) conception of a meaning perspective. Pajares (1992) stated the following:

> Conceptualizing a belief system involves the understanding that this system is composed of beliefs connected to one another and to other cognitive/affective structures, complex and intricate though these connections may be, that form beliefs about constructs—beliefs about politics, about abortion, about art, about the nature of knowledge. (pp. 315-316)

While on the surface meaning schemes may appear to contain contradictions, in reality they are unified by an underlying meaning perspective that includes an educator's educational, metaphysical, and epistemological beliefs (Pajares, 1992). While changes in an educator's meaning schemes may be enlightening, they do not rise to the level of cognitive change that occurs with a shift in a meaning perspective.

An educator's meaning perspective is the product of first-hand educational experiences and results in "cognitive and behavioral traps" (Richardson et al., 1991, p. 38). First-hand experiences enculture educators through observation, participation, and

imitation (Ball & Cohen, 1999; Fairbanks et al., 2010; Huberman, 1993; Lortie, 1975; Pajares, 1992; Richardson, 1990). These individual experiences create a common-sense, real-world belief system about teaching that fosters assumptions that are not open to scrutiny and are referred to as personal, practical knowledge (Fairbanks et al., 2010; Pajares, 1992; Richardson et al., 1991). Though biased in favor of one's own limited experience, selected episodic memories, and situational success, educators rely on their meaning perspective to decide whether a new idea or theory will work, or how it should be implemented properly (Lortie, 1975).

Because an educator's meaning perspective is both personal and formed early, it is a core belief that is extremely resistent to change (Nisbett & Ross, 1980). Programs of educator preparation that attempt to expand or change an educator's meaning perspective have limited impact (Cochran-Smith & Fires, 2008; Cochran-Smith & Zeichner, 2005; Wilson, Floden, & Ferrini-Mundy, 2001). Within the first few years of practice, an educator's meaning perspective is largely formed and restricts what one may consider or accept in the future (Lortie, 1975; Pajares, 1992). A gestalt-like shift is required for change to occur (Nespor, 1987), in which one's previous meaning perspective is seen as no longer viable and is rejected in favor of a better one.

Conflict and disorientation. A meaning perspective often needs to be adapted when new or unique problems arise. If too great an adaptation is required, a person is likely to discount or ignore the problem rather than change (Cavanaugh & McGuire, 1994; Geijsel & Meijers, 2005). Over time, a person's ideals can become increasingly misaligned with realities (Quinn, 1996), and the frequency or intensity of anomalies can become so overwhelming that they cause a disequilibrium (Cavanaugh & McGuire,

1994). A person's first, instinctive reaction is to resist the anxiety associated with disequilibrium. Instead, one may deny that the problem is valid, hold on more tightly to past assumptions, jump to conclusions, find distracting issues, blame others, or exit the situation (Heifetz, 1994; Quinn, 1996).

An educator's meaning perspective is largely the result of personal, episodic moments and is held as a core belief. Therefore a change in one's meaning perspective is very difficult. First, it represents a second-order change (Richardson, 1990) involving the rejection and reinterpretation of one's previous perspective (Mezirow, 1991). Second, because it is closely connected to the educator's affect, sound evidence will not be sufficient to change it (Geijsel & Meijers, 2005). Beliefs based on second-hand knowledge, learned in coursework rather than by experience, are more susceptible to manipulation because they are at one's periphery rather than one's core beliefs (Ertmer, 2005). Buchmann (1987) claimed that the reliance on first-hand experience as a student, pre-service educator, and intern limits most educators to remain conservative "tadpoles" (p. 162). It is not suprising then that the literature on educator development speaks about the difficulty of effecting change (Britzman, 1991; Buchmann & Schwille, 1983; Dewey, 1933; Fairbanks, et al., 2010; Richardson, 1990; Wei et al., 2009; Yoon et al., 2007).

Educators experience times when they encounter new beliefs or problem situations that cannot be reconciled with their existing meaning perspective (Ertmer, 2005; Pajares, 1992). Such incidents lead to times of cognitive dissonance in which an educator becomes dissatisfied with the existing meaning perspective's ability to solve the problem. In such a circumstance an educator may be open to new ways of

addressing the problem (Dewey, 1933). “All individuals suffer attacks of cognitive dissonance, where incompatible beliefs are suddenly thrust on them and they must behave in a manner consistent with only one of these beliefs” (Pajares, 1992, p. 319).

A potential for cognitive conflict and disorientation occurs when an educator encounters an anomaly (Pajares, 1992). An anomaly is a condition, experience, or problem that cannot be resolved using the existing meaning perspective. The anomaly may be a very strong or persistent one, or the accumulation of many smaller ones. Sometimes educators identify these anomalies on their own and may seek out instruction to help them find a solution. Other times educators dismiss them as irrelevant because they are masked by the educator’s current belief systems. Educator cognitive change begins when anomalies are exposed. Exposure of the anomaly involves making a person’s current belief system or biases explicitly known (Richardson, 1990).

Educational leaders make biases explicit by demonstrating the difference between reality and the ideal (Heifetz, 1994). Data-driven reflection is one method educational leaders use to make the anomalies and inaccurate meaning perspectives explicit (York-Barr et al., 2006) for it is the real experiences of education that lead to changes, “not the persuasiveness of the reformer’s ideas” (Kennedy, 2005). Revealing a meaning perspective to be inconsistent with reality creates a sense of conflict and disequilibrium in the learner that is uncomfortable and needs to be resolved (Pajares, 1992).

Educational leaders also use development programs to move educators to some new way of action, and possibly a new way of thinking (Darling-Hammond et al., 2009;

Ertmer, 2005; Guskey, 2002; York-Barr et al., 2006). Depending on their individual motivations for participating in the development program, s/he will respond to the new learning in one of three basic ways: 1) accepts or rejects the learning depending on whether it agrees with her/his existing meaning perspective; 2) modifies the information to conform to her/his existing meaning perspective; or 3) shifts her/his meaning perspective to incorporate the new learning (Buchmann & Schwille, 1983; Ertmer, 2005; Geijsel & Meijers, 2005; Guskey, 2002; Kennedy, 2005; Pajares, 1992; Richardson, 1990).

The first thing educators engaged in development will do is try to relate the new learning or practice to their existing meaning perspective. On the basis of this comparative evaluation, the new learning will be either rejected or accepted. If the learning agrees with one's meaning perspective, an educator easily adopts the new activities (Kennedy, 2005; Richardson, 1990). If the new learning does not fit within the educator's existing meaning perspective, it will be discarded as impractical or too theoretical. Such ideas will not even be tried because they won't work in the real world (Buchmann & Schwille, 1983). Shifting one's meaning perspective is difficult and emotional work because it involves cognitive disequilibrium, mental effort, and the release of previously close-held beliefs (Ertmer, 2005; Nespor, 1987; Pajares, 1992; Richardson, 1990).

A second reaction educators have to learning which challenges their meaning perspective is to distort or misapply it to fit their existing meaning perspective (Pajares, 1992; Richardson, 1990). The new methods or practices may be especially compelling because they have been implemented successfully by others or promise greater

achievement (Ertmer, 2005; Guskey, 2002). Rather than altering their meaning perspective, however, educators will adapt the promising new practice in a way that is consistent with their existing meaning perspective. When educators adapt or change the new practices upon implementation, the practices may appear to be similar on the surface, but they are "embedded in different belief sets, intentions, and theoretical frameworks" (Richardson, 1990, p. 16). These conceptual changes doom the newly acquired practice to limited success or even failure (Kennedy, 2005; Richardson, 1990).

Cognitive shifts. The educational literature is clear that although educator meaning perspectives do not easily change, they can and do. Resolving the disequilibrium requires a kick to overcome the inertia of a preferred mode of thought. Personal disequilibrium is resolved when an "aha" moment results in shifting one to a new meaning perspective and brings renewed confidence. (Cavanaugh & McGuire, 1994). These changes occur in a conversion-type process, with a gestalt shift rather than through argument or reason (Ertmer, 2005).

Mezirow et al. (2009) found that such transformations in a meaning perspective includes ten phases of learning. These phases include a disorienting dilemma, a self-examination, a critical assessment of assumptions, the recognition that one must learn and grow, and the steps one takes to acquire and reinforce the new skills needed to change (p. 19). The transformed perspective guides future action in a new direction for the learner. Facilitating transformative learning requires sufficient communication, motivation, learner self-efficacy, and a meaningful context. Geijsel and Meijers (2005) added that such learning is actually a change in one's identity and requires consideration of both one's cognitive and emotional needs.

The education literature outlines several factors that must be considered for educator development to lead to cognitive changes. These factors include the educator's current content and pedagogical knowledge, the educational context, the educator's self-efficacy, sufficient time, and the existing meaning perspective (Cuban, 1993; Fairbanks et al., 2010; Fishman et al., 2003; Jackson, 1986; Shulman, 1986, 1987; Wei et al., 2009). Overcoming one's bias toward heuristics and allowing oneself to give rational consideration requires time and intent, but it also requires a willingness to question one's beliefs and the self-efficacy to accept the consequences (Geijsel & Meijers, 2005).

Mezirow et al. (2009) stated that transformative learning (cognitive change) occurs when prior experiences are reinterpreted to create a new meaning perspective. It involves rational thought to critically examine the "assumptions supporting one's perspectives and to develop critically reflective judgment in discourse regarding one's beliefs, values, feelings, and self-concepts" (Mezirow et al., 2009, p. 29). This willingness to question one's assumptions rather than act upon the assimilated beliefs of one's culture requires openness and a safe, supportive environment.

In *How We Think*, Dewey (1933) spoke of the necessity of engaging in reflective thought to avoid prejudgments that may or may not be true. He describes reflective thought as "a conscious and voluntary effort to establish belief upon a firm basis of evidence and rationality" (p. 9). Reflective thought suspends judgment and uses data together with past experience and previous knowledge to critically examine and intellectually search for solutions to a problem. To do so requires a willingness to engage in uncertainty. Such reflective thinking, Dewey believed, contradicts our

"natural tendency to believe anything that is suggested unless there is overpowering evidence to the contrary" (Dewey, 1933, p. 24).

Dewey (1933) further believed that reflective thought requires principles of open-mindedness, whole-heartedness, and responsibility. Open-mindedness is a willingness to avoid prejudice, consider new ideas, discard pet notions, and admit one's mistakes. Whole-heartedness means one must not sit on the fence, but engage completely in the problem and its solutions. Responsibility requires a commitment of time and opportunity to complete the inquiry and follow through on adopting any actions that result. Dewey proposed that reflective thinking relies on a commitment to open-mindedness, and that it can be trained and fostered.

Fairbanks et al., (2010) agreed that reflective thought is important among educators and that it can be encouraged. The key, they believed, was fourfold. First, the educator's *beliefs* about teaching, learning, and himself must be made explicit and available for "conscious examination" (p. 163). Second, the educator requires a *vision* toward a morally ideal and cognitively based classroom. Third, the educator needs to engage in creating *belonging*, or a sense of confidence in one's teaching environment. Finally, the educator must recognize how *identity*, both others' and one's own, plays an important role in shaping the environment. Reflective thought is encouraged when one is enabled to critically examine one's beliefs and increase one's self-efficacy. This type of educator cognitive change is rare (Kennedy, 2005).

Summary. Individual educator change, like change in educational organizations, rarely occurs. Educators operate according to an individual system of beliefs, or meaning perspective, that are largely formed on the basis of personal

experience (Fairbanks, et al., 2010; Pajares, 1992; Richardson et al., 1991). Educational leaders attempt to change teachers' meaning perspectives through educator development programs and data-driven reflection (Darling-Hammond et al., 2009; Ertmer, 2005; Guskey, 2002; Kennedy, 2005; Pajares, 1992; York-Barr et al., 2006). These development programs often fail to produce the intended meaning perspective changes (Ertmer, 2005; Guskey, 2002; Kennedy, 2005; Richardson, 1990).

Individual educator change does occur, but it is a difficult process through an identified set of stages. It begins with a disorienting dilemma that alerts the educator that the existing meaning perspective is inadequate to navigate the educational environment (Fairbanks et al., 2010; Mezirow, 1991). Next, the educator must engage in reflection to examine assumptions, recognize the need to grow, and take steps to learn new skills (Mezirow, 1991). Such reflection depends on open-mindedness and self-efficacy, and a sufficient level of time, support, and collaboration (Cuban, 1993; Fairbanks et al., 2010; Fishman et al., 2003; Jackson, 1986; Shulman, 1986, 1987; Wei et al., 2009). Finally, reflection under such conditions may lead to a sudden, "aha"-type shift in an educator's meaning perspetive (Cavanaugh & McGuire, 1994; Ertmer, 2005; Mezirow, 1991).

Neuroscience Perspective

Educator cognitive change is located within the individual. A behavioral level of analysis permits study of change at the organizational and individual level, but examining the neural mechanisms that support that change requires a look inside the brain. The advent of new technologies allows researchers to discover brain activation patterns that give new insights into the neural mechanisms at work during learning and

decision-making (Geake & Cooper, 2003). Neuroscientists use a combination of behavioral data, functional magnetic resonance imaging (fMRI), and electroencephalographic (EEG) records to measure what is happening inside the brain. Behavioral data typically includes response times to activities, psychological tests, and questionnaire-type measurement tools. Functional MRI records the hemodynamic response in the brain as oxygen-rich blood is sent quickly to areas of the brain that are active, and maps the blood oxygenation level dependent (BOLD) contrasts. EEG uses an electrode cap to measure electrical activity as event-related potentials (ERP) and records them as error-related negativity (ERN) waves. Size, timing, and location of ERN amplitudes give evidence of brain activity.

Neuroscience studies are not well-suited to map the complex cognitive constructs at the level of cognitive change directly (Willingham & Lloyd, 2007). However, theories of cognitive change suggest lower-level constructs that may subserve cognitive change. These lower-level constructs include networks involved in reasoning, emotions, bias, and belief inhibition, and mechanisms that monitor conflict and detect error. An accumulation of neuroscience studies on these topics exist and are used to support theories related to more complex cognitive constructs (Lieberman, 2010). Lieberman (2010) stated that “identifying the involvement of brain regions with well-characterized functions can help us identify which corresponding psychological processes may contribute to the total mental act” (p. 173). This section reviews the neuroscience literature related to the following processes: 1) Cognitive Conflict, 2) Automatic Processes, and 3) Controlled Processes.

Cognitive Conflict

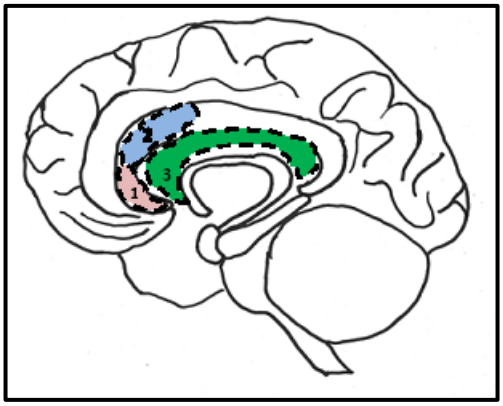

Figure 1. **Regions of the Cingulate Cortex[i].**
1. rACC 2. dACC 3. Corpus Callosum

Cognitive Change begins with cognitive conflict. This conflict signals a need to change one's usual response to a stimulus. Neurological studies that are concerned with cognitive conflict generally find that such conflict activates a region of the brain known as the anterior cingulate cortex (Amodio et al., 2004; De Neys, Vartanian, & Goel, 2008; Egner, 2008; Egner, Delano, & Hirsch, 2007; Egner, Etkin, Gale, & Hirsch, 2007; Gehring & Fencsik, 2001; Raz, Fan, & Posner, 2005) . The cingulate cortex is located in the inner area of the brain that surrounds the corpus callosum (see Figure 1[i]), the connector between the right and left hemispheres. The anterior portion is the front of the cingulate cortex. The anterior cingulate cortex (ACC) has been shown to demonstrate increased activation during times of cognitive conflict. Cognitive conflict occurs in two ways: 1) Conflict detection and 2) Error detection.

Conflict detection. Cognitive conflict often involves competing data. Neural activation occurs in the dorsal (top) region of the anterior cingulate cortex (dACC) in a variety of conflict conditions. The dACC is activated when conflict occurs due to competing stimuli (Egner, Delano, & Hirsch, 2007; Mohanty, et al., 2007), when the stimulus and response conflict (Egner, Etkin et al., 2007), and when conditioned responses must be inhibited (Amodio, Master, Yee, & Taylor, 2007). Other activation in the dACC is related to conflict due to differing goals (Egner, 2009), differences

between beliefs and data (De Neys et al., 2008), deciding whether to gamble or not (De Martino, Kumaran, Seymour, & Dolan, 2006), racial bias (Amodio et al., 2004), active combat during video games (Matthiak & Weber, 2006), and deciding whether to be honest or dishonest (Greene & Paxton, 2009).

Several neurological studies have attempted to clarify the specific role that the dACC plays in conflict detection. According to these studies the dACC appears to be part of an early, automatic warning system that detects conflicting stimuli and sends a signal to executive neural areas that cognitive control is necessary (Amodio, Master et al., 2007; Egner, 2007; Gehring & Fencsik, 2001). Regions of the dACC appear to be specialized for detecting certain types of conflicts and alerting an appropriate, corresponding neural region (Egner 2007, 2008, 2009; Egner & Hirsch, 2005; Mohanty et al., 2007).

Error detection. Cognitive conflict may occur as the result of an error. The rostral (bottom) portion of the ACC (rACC) has been shown to be activated when errors are made. This portion is lower and more forward than the dACC and is associated with emotional processing (Mohanty et al., 2007; Rubia, Smith, Brammer, & Taylor, 2003). Studies suggest that the rACC is involved when one feels badly either because of one's own, or someone else's error (Chiao, Mathur, Harada, & Lipke, 2009; Van Schie, Mars, Coles, & Bekkering, 2004), and that the more one is confident in one's own convictions, the less the rACC is active (Amodio, Jost, Master, & Yee, 2007; Inzlicht, McGregor, Hirsch, & Nash, 2009). Therefore, while detecting error is an important signal that cognitive change should occur, neurological studies suggest that error detection is less likely to occur in the presence of a strongly-held meaning perspective.

Automatic Processes

Cognitive change is prevented by allegiance to an existing meaning perspective. The meaning perspective is the product of personal experiences and beliefs that guide action and decision-making (Geijsel & Meijers, 2005; Quinn, 1996). The personal experiences and beliefs provide an automatic, common-sense interpretation of daily life that is rarely open to scrutiny, regardless of its validity (Dewey, 1933; Fairbanks et al., 2010; Weick, 1993). Neuroscience studies have examined automatic networks and processes that may underlie automatic, biased responses. These automatic networks are fast, unlikely to be interrupted, and outside of consciousness (Lieberman, 2010). The most common regions associated with these networks are the amygdala, ventromedial prefrontal cortex (vmPFC), the lateral temporal cortex, and the ventral striatum (see Figure 2) (Lieberman, 2010). Neuroscience studies involving automatic processes fall into the following three categories: 1) Emotional network, 2) Default network, and 3) Belief-biasing.

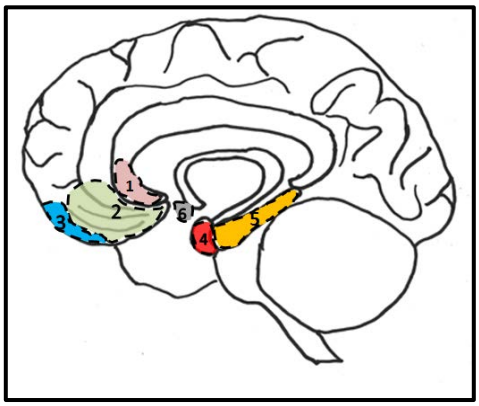

***Figure 2*. Automatic Processing Neural Regions[i].** 1. rACC 2. vmPFC 3. orbitofrontal PFC 4. amygdala 5. hippocampus 6. ventral striatum

Emotional network. Neuroscience studies have identified a network of neural mechanisms involved in emotional processing. The most prominent of these is the amygdala, which is involved with feelings of fear, anger, and pleasure (Bechara & Damasio, 2005; De Martino et al., 2006; Lieberman, 2010; Ochsner & Gross, 2004). In general, the emotional network is thought to involve the rACC in monitoring errors and

situations requiring emotional control. The rACC, in turn, signals the amygdala and other limbic regions of the brain as well as the medial frontal and orbitofrontal cortex (Mohanty et al., 2007). These frontal regions, in particular the ventromedial prefrontal cortex (vmPFC), have been shown to be associated with emotional regulation and decision-making (Bechara & Damasio, 2005; Deppe, 2005a, 2005b; De Martino et al., 2006; Westen, Blagov, Harenski, Kilts, & Hamann, 2006). The ventral striatum is found to be activated with the amygdala when emotional decisions are made implicitly (Bechara & Damasio, 2005; Lieberman, 2010).

Various studies provide evidence that these neural mechanisms regulate one another as part of a network of emotional processing. Greater activation in the rACC has been shown to be associated with decreased amygdala activity (Egner, Etkin et al., 2007). A study by DeMartino et al., (2006) found that the use of framing activated the left and right amygdala and the orbito-medial prefrontal cortex (omPFC). However, the more the framing influenced the decision, the less the omPFC was activated. Conversely the more the omPFC was active, the less effect the framing had.

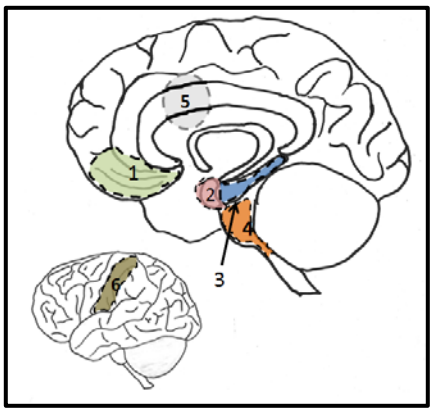

***Figure 3*. Somatic marker hypothesis neural regions[i].**
1. vmPFC 2. amygdala 3. hippocampus 4. brain stem 5. insula 6. somatosensory cortex

The hippocampus, amygdala, and ventromedial prefrontal cortex (vmPFC) seem to work together in forming and recording emotional memories (Bechara & Damasio, 2005; Blakemore & Frith, 2005). According to Bechara & Damasio's (2005) somatic marker hypothesis (see Figure 3), implicit memories are not only stored in the memory

systems for later retrieval, but also engage neural areas associated with emotion. These neural areas, the amygdala and the vmPFC, encode the neurological and biological responses, or the somatic states. When a previously experienced stimulus occurs, the amygdala (and sometimes the vmPFC) triggers the effector structures that re-execute those encoded somatic states and their neural patterns “in the brainstem nuclei and in the somatosensing cortices” (p. 341).

The indirect recall of that experience, perhaps through recall of the memory or external suggestion, activates the vmPFC to re-couple those same states, but fainter. These physiological re-creations allow one either to re-experience previously associated feelings consciously, or to activate patterns and emotional states at a subconsious level. These conscious and unconsious somatic responses influence one’s decision-making and bias it in favor of previous experience, even those experiences of which one is unaware. One often describes such an unconsiously made, automatic decision as a “hunch” or “gut reaction.” The nearer to the amygdala within the prefrontal cortex the decision is made, the more likely it is to be automatic and proceed from strong, emotional, episodic memories.

Default network. The default network is a system of neural processes that are active when the brain is resting and less active when cognitive tasks are occurring (Lieberman, 2010). Because they are always on, they are potentially involved in automatic processing. A recent study by Greicius, Krasnow, Reiss, and Menon (2003) identified regions of the brain that are active during rest. They found that the default network involves many of the same neural mechanisms mentioned in studies of automatic systems. They used a process of functional connectivity MRI to determine

not only which regions of the brain activate during certain activities, but also which regions activate or deactivate in concert with one another. Participants' brain activations were measured during three conditions, a resting condition, a working-memory condition, and a visual-processing condition.

During the resting condition the posterior cingulate cortex (PCC) and the ventral cingulate cortex (another name for the rACC) were active and associated with activation in the medial prefrontal cortex (mPFC) and the orbitofrontal cortex (OFC). These and other regions associated with the emotional processing network are believed to be involved with retrieval of episodic memories, manipulation of past events, and making future plans. The left and right ventrolateral prefrontal cortex (vlPFC) and the right dorsolateral prefrontal cortex (dlPFC), which are associated with executive functions and working memory, were activated inversely to the PCC during the working memory task. More importantly, this study suggests a critical link between emotional processing and basic affective and autonomic states. This connection may help to explain how the emotional network is ideally suited to be automatically recruited for decision-making.

Belief-biasing. The same neural regions implicated in default networks and emotional processing are automatically recruited in situations of bias toward pre-existing beliefs, episodic memories, and "real world" occurances of base rates (i.e. if it has happened to you, it is more likely to be true—regardless of actual probabilty) (Amodio et al., 2004; De Neys et al., 2008; Deppe et al., 2005a, 2005b; Westen et al., 2006). Deppe et al. (2005a), found that the medial prefrontal cortex (mPFC) and the cingulate cortex, especially the posterior region (PCC), was active when participants selected their first-choice brand over competing products, while areas associated with

reasoning, such as the dlPFC and posterior parietal cortex (PPC), were deactivated. In a "winner-take-all" (Deppe et al., 2005a, p. 180) decision, participants made selections based on emotion rather than facts. Similarly, the ventromedial prefrontal cortex (vmPFC) was active when participants rated implausible headlines as plausible because the headline came from a magazine they liked (Deppe et al., 2005b).

In instances when one's bias is followed, the rACC and the vmPFC are usually involved. Westen et al., (2006) found that the ventral ACC (a portion of the rostral ACC) and the medial PFC were active only when political partisans rated their favorite 2004 U.S. presidential candidate's clearly contradictory statements as not contradictory. Goel and Dolan (2002) found that, in subjects who were biased towards their beliefs regarding syllogisms (selecting logically inconsistent answers), the rACC and the ventro-medial prefrontal cortex (vmPFC) were engaged.

The ACC's role seems to be to signal that a conflict is present or that an error has occurred, but bias may occur under some conditions despite that signal. One such condition is time limitation. Limited time may necessitate an automatic, biased response. In one study, participants in a study were given limited time to decide whether a white or a black man was holding a gun or tool. The decision-making time constraints caused participants to ignore their conflict-monitoring system and tend toward racial bias (Amodio et al., 2004). People are also likely to be biased in favor of most recent experiences. Suppressed activation in the fusiform face area (FFA) during repeated trials displaying the same face signaled that the brain conserves resources by predicting the next condition to be the same (Summerfield, Trittschuh, Monti, Mesulam, & Egner, 2008). These results agree with the somatic marker hypothesis (Bechara & Damasio,

2005) that states that most recent episodes are more powerful than distant ones and that the brain tends to bias in favor of them. The somatic marker hypothesis also states that the ACC predicts repeating patterns after only two occurrences, and that this contributes toward our “gut feelings” or “hunches” (p. 359).

Controlled Processes

Cognitive control is considered important for meaning perspective change to occur. Cognitive control requires the time, willingness, and ability to suspend one’s automatic responses and instead engage in analytic and reflective thought (Dewey, 1933; Fairbanks et al., 2010; Geijsel & Meijers, 2005; Mezirow, 1991). Networks of neural processes associated with cognitive control are considered to be slow, intentional, interruptible, conscious, and often of limited capacity (Lieberman, 2010). Neural regions often associated with controlled processes (see Figure 4) are the lateral prefrontal cortex—including the ventrolateral (vlPFC) and dorsolateral prefrontal (dlPFC) cortices, the lateral parietal cortex, and the medial and dorsomedial prefrontal cortices (Lieberman, 2010). Neuroscience studies of controlled processes are organized here into two sections: 1) Reasoning networks, and 2) Belief inhibition.

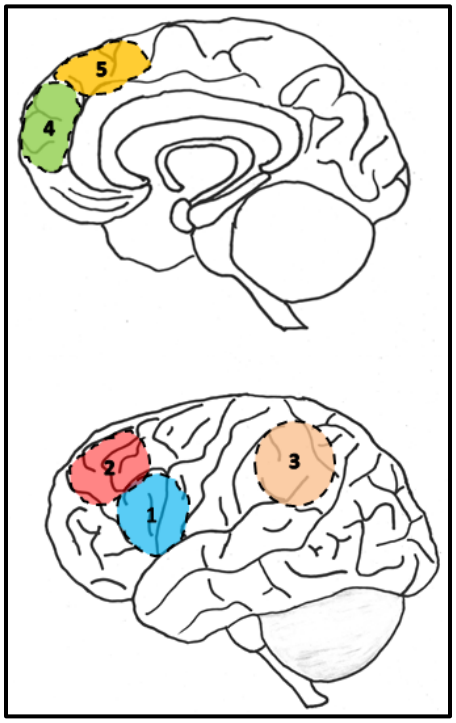

***Figure 4*. Neural Regions of Control[i].** 1. vlPFC 2. dlPFC 3. parietal cortex 4. mPFC 5. dmPFC

Reasoning network. The ability to reason and make purposeful, logical decisions seems to involve neural networks associated with the dACC and regions of

both the lateral prefrontal cortex (LPFC) and the parietal cortex, depending on the task. This system is thought to involve executive functions such as hypothetical, rational, and probabilistic thinking; and willful control (Goel & Dolan, 2004; Lieberman, 2010; Raz & Buhle, 2006). Activation in neural regions associated with control and reasoning is negatively correlated with regions associated with automatic and emotional processing (De Neys et al., 2008; Deppe, et al., 2005b; Greicius et al., 2003; Lieberman, 2010).

Answering correctly despite the presence of a distracting stimulus involves both the dACC and the dorsolateral prefrontal cortex (dlPFC) (Mohanty, et al., 2007). This suggests that the dACC signals the presence of a conflict and the need for cognitive control to the dlPFC, which in turn exerts top-down control to sensory-motor areas such as the fusiform face area (FFA), in order to amplify activation and preferential attention toward face targets (Egner & Hirsch, 2005). Further studies found that the dlPFC directed structures in the medial temporal lobe and neocortical structures to encode memories for later retrieval of faces and houses (Summerfield, Egner et al., 2006). However, the ability to exert cognitive control over automatic processes is limited under conditions of high working-memory load (Kelley & Lavie, 2010).

Reasoning tasks use various regions of the prefrontal and parietal cortices. Goel and Dolan (2004) used fMRI to examine how participants processed syllogisms that required either inductive (prior knowledge) or deductive (contextual clues) reasoning. They found that brain area activated during deductive reasoning was the left prefrontal cortex (left PFC), or Broca’s Area. Inductive reasoning activated the dlPFC. Mansouri, Tanaka, and Buckley (2009) used studies with lesion patients, monkeys, and rats to demonstrate that the dlPFC is involved with short-term retrieval of memories and that

the posterior parietal cortex (PPC) is very involved in overriding habitual response, inhibiting distractions, solving new problems, or shifting between tasks.

Egner (2009) synthesized studies to show that parallel neural networks are involved with rational decision-making in a heirarchical manner. Specifically, the dACC is activated by goal-relevant stimuli and recruits the mid-lateral prefrontal cortex (mid-LPFC). However, the upper dACC, which is associated with the pre-supplementary motor area (pre-SMA), is activated by cost-benefit conflict and recruits the posterior-LPFC. The posterior-LPFC gives input for the mid-LPFC to weigh as part of the decision-making process, but the process does not communicate in reverse.

Belief inhibition. While more studies are conducted about belief-bias, there is also research on how our brain inhibits beliefs in favor of reason. The ACC detects a conflict between what we believe and reality whether we realize it or not, but we may still fail to inhibit the incorrect response in favor of a more reasoned one (De Neys et al., 2008; De Neys & Franssens, 2009; Rubia et al., 2003). Several studies have found that inhibiting an incorrect response is associated with an increase in activation in the right prefrontal cortex (right PFC) (Goel & Dolan, 2002; Konishi et al., 1999; Rubia et al., 2003). Intentional, goal-oriented behavioral responses have been shown to engage the left prefrontal cortex (left PFC) as well (Amodio, Master et al., 2007).

Fugelsang and Dunbar (2005) demonstrated that the dACC, the left dlPFC and the precuneus activated when participants decided to reject the belief that a pill was an effective treatment for depression in the face of data that showed it was only effective half of the time. This study demonstrated that to inhibit one’s bias, the conflicting data

must be noted (dACC), and working memory (dlPFC) and attentional processing (precuneus) are necessary.

Summary

Neuroscience studies have identified neural networks and their mechanisms that appear to be associated with aspects of human cognitive change. Processes associated with automatic networks orient one's thinking in terms of a meaning perspective. Implicit and explicit memories become associated with emotional states that provide a basis for automatic, efficient, and sometimes biased decision making (Amodio et al., 2004; Bechara & Damasio, 2005; Deppe et al., 2005a, 2005b). Controlled processes allow for careful consideration and reflection, but these proceses are slow with limited capacity (Amodio et al., 2004; Kelley & Lavie, 2010). As automatic processes come online, working memory is freed for controlled processing (Lieberman, 2010).

Conflicting messages or the commission of errors alerts a person to exert cognitive control (Mohanty et al., 2007), but control may be prevented due to inherent bias (Deppe et al., 2005a; 2005b; Westen et al., 2006), expectation (Summerfield et al., 2008), lack of time (Amodio et al., 2004), strength of conviction (Amodio, Jost et al., 2007; Gehring & Fencsik, 2001; Inzlicht et al., 2009), inability to generate alternatives (De Neys et al., 2008), and cognitive overload (Kelley & Lavie, 2010). Successful cognitive control and rational decisions occur when the ACC signals neural regions associated with controlled processes to engage top-down control to inhibit automatic and emotional responses (Amodio, Master et al., 2007: Mohanty et al., 2007) in favor of increased attentional resources (Egner & Hirsch, 2005) and reasoning (Deppe et al., 2005a, 2005b; Lieberman, 2010).

Conceptual Framework: Transdisciplinary Perspective

The education and neuroscience literature reviewed above provides an outline for a transdisciplinary perspective of educator cognitive change. The resulting conceptual framework takes into account what cognitive and neuroscience studies have discovered about the way the brain actually functions, and coordinates it with research and theories from the actual context of change. Rather than using one discipline to inform the other, this framework uses the findings and theories generated by several disciplines within their limits and shows how they complement and inform each other. In doing so, the framework adds context and meaning to neurological studies, and suggests which social science studies and theories are plausible, based upon the actual function of the brain. For the purpose of this dissertation, the conceptual framework will be used for understanding and examining educator cognitive change.

The conceptual framework implies four phases of cognitive change. The first phase consists of a person's operation within an existing meaning perspective. The second is a period of cognitive conflict. Third is a process of reorientation, and the fourth phase is resolution and the establishment of a new meaning perspective. These phases are described briefly under the following sub-headings: 1) Phase 1: Meaning Perspective, 2) Phase 2: Cognitive Conflict, 3) Phase 3: Reorientation, and 4) Phase 4: Resolution.

Phase 1: Meaning Perspective

Most time is spent operating within one's meaning perspective. We are predisposed to interpret our present experience in light of previous memories and knowledge and our interpretation of them (Mezirow, 1991). This background knowledge allows us to make sense of our current situation (Brunner, 2004; Deppe et al., 2005a ; Fairbanks et al., 2010) and provides a means for making decisions in complex environments (Buchmann, 1987; Deppe et al., 2005a, 2005b; Lortie, 1975). The meaning perspective also influences what we notice and how we interpret it (Egner & Hirsch, 2005; Goel & Dolan, 2002; Inzlicht et al., 2009; Mezirow, 1991; Richardson, 1990; Westen et al., 2006). While our meaning perspective often leads to successful navigation of daily life, there are times when it causes us to make mistakes (Dewey, 1933; Westen et al., 2006) or fail to change despite a changing environment (Kuhn, 1962; Quinn, 1996).

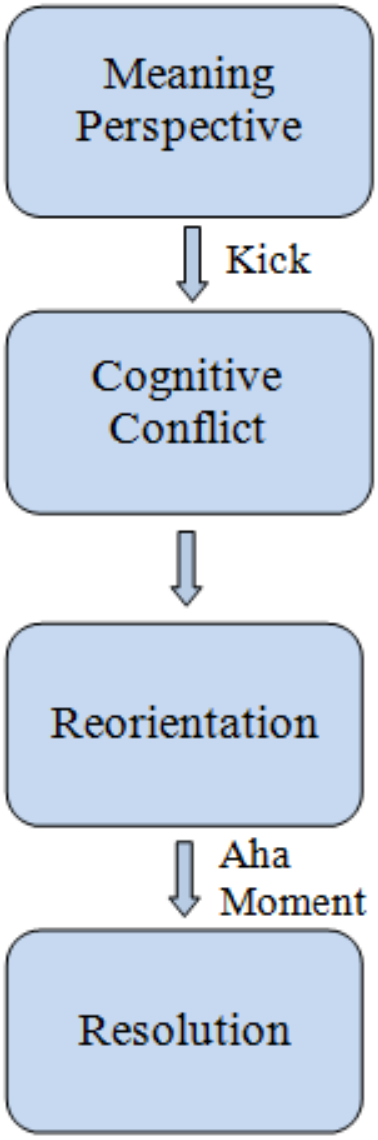

***Figure 5*. Conceptual framework of educator cognitive change.**

People have two types of neural systems that account for the thought patterns and behaviors that govern their navigation of daily navigation. One type of system relies on automatic, subconscious processing that draws upon learned information and

behaviors, as well as stored memories, to inform thinking and action (Lieberman, 2010). There are various neural networks that comprise these automatic systems. One automatic network involves emotional processing which creates physiological changes to subserve decision-making (Bechara & Damasio, 2005). This network of automatic systems includes such mechanisms as the ventromedial prefrontal cortex and areas associated with the limbic system such as the amygdala. It is associated with heuristic thinking and biased responses according to previous experience (Bechara & Damasio, 2005; Lieberman, 2010).

A second type of system is analytical. It uses information supplied by automatic processes like informational and episodic memories, and combines it with new input to make one's ideas explicit and to manipulate information within working memory for thinking, reasoning, and generating new ideas. It also exerts cognitive control over other neural regions by either amplifying or inhibiting their signals (Egner et al., 2007; Egner & Hirsch, 2005; Summerfield, Egner et al., 2006). This system includes the lateral prefrontal and parietal cortices (Bechara & Damasio, 2005; Lieberman, 2010).

Phase 2: Cognitive Conflict

Environmental feedback may provide a *kick* to signal that the meaning perspective is wrong and needs to be altered (Cavanaugh & McGuire, 1994). Anomalies, conflict, or errors can serve as the environmental feedback (Kuhn, 1962). If their signal is not detected, or is ignored (De Neys & Franssens, 2009), it will not serve as a kick. However, if they are noticed, it can usher in cognitive conflict, the next phase of change.

Cogntive conflict involves two components. The first is conflict detection. During conflict detection neural mechanisms may signal the presence of a conflict (Egner, Delano et al., 2007) or commission of an error (Margulies, et al., 2007; Rubia et al., 2003). These neural mechanisms signal the need to inhibit the automatic processes (Egner, Delano et al., 2007), amplify other cortical regions (Egner & Hirsch, 2005), and call forward previous memories and knowledge into working memory to resolve the conflict or correct the error. If a person lacks the time (Amodio et al., 2004) or self-efficacy (Bandura, 1993) to complete the task, the conflict will lead to disorientation, the second stage of cognitive conflict.

Disorientation may occur when we know our meaning perspective is wrong but are unable to devise a better one. This leads to an unpleasant sensation because the automatic systems we usually rely on to understand and make decisions are exposed as unrealiable. The disorientation may be caused by a lack of sufficient background knowledge (Weick, 1993), by physiological and emotional changes making the logically incorrect response feel right (Bechara & Damasio, 2005; Mohanty et al., 2007; Rubia et al., 2003), and by a low self-efficacy resulting from the sudden loss of control (Bandura, 1993).

Phase 3: Reorientation

Reorientation involves a period of time when alternative mental representations of the meaning perspective are considered. This phase requires use of controlled processes. Reorientation takes time and energy and entering it requires that we inhibit an automatic response so that the resource demanding cognitive activity can occur

(Amodio, Master et al., 2007; Deppe et al., 2005a; 2005b; Egner & Hirsch, 2005; Lieberman, 2010; Mohanty et al., 2007).

Successful reorientation depends on certain capacities. Educators must be willingly open to new ideas (Dewey, 1933), and have the ability to be reflective (Fairbanks et al., 2010; Kennedy, 2005). Additionally, people must possess sufficient self-efficacy to allow them to subject their current beliefs to scrutiny and to believe the can change their meaning perspective (Bandura, 1993). Other factors that support reorientation include sufficient time (Yoon et al., 2007), opportunities to collaborate (York-Barr et al., 2006), and a supportive context (Seashore-Louis, 1998).

Phase 4: Resolution

Resolution is ushered in by an “aha” moment (Cavanaugh & McGuire, 1994; Kuhn, 1962). This is an all-at-once moment that occurs when one comes upon an understanding of the solution. The resolution involves a deep, personal change (Quinn, 1996) that is not reversible because the new meaning perspective is seen as superior to the old. The knowledge, understandings, and memories are reorganized into a new meaning perspective that can be articulated in a way that is fundamentally different from the old one (Mezirow, 1991). The new meaning perspective becomes the new automatic response that guides action and decision making.

The above conceptual framework presents a tangible way to picture the process of educator congitive change and provides a theoretical approach from which to examine incidents of cognitive change. As such, it serves as a useful lens through which to gain a deeper understanding of the phenomenon of cognitive change. Application of

this conceptual framework to actual lived experiences may reveal where this framework is either useful or lacking.

[i] All figures are created by this proposal's author and are drawn from numerous neuroscience study reports and syntheses, especially works by Bechara & Damasio (2005), Blakemore & Frith (2005), Egner (2009), Lieberman (2010), Mohanty et al. (2007), Ochsner & Gross (2003), Summerfield & Egner (2009), and Summerfield et al. (2006).

CHAPTER THREE:

METHODS AND DESIGN

The two-fold purpose of this exploratory qualitative dissertation is: 1) to gain a transdisciplinary understanding of educator cognitive change, and 2) to use that understanding to develop a model of educator cognitive change. This study, then, seeks to answer the following questions:

1. How might qualitative data be analyzed to capture observable phenomena associated with cognitive change?
2. How might an original model that incorporates education and neuroscience literature provide explanation for educator cognitive change?

To fulfill these research purposes and answer the research questions, this research employed an exploratory process in which qualitative data gathered from a specific educator development process was inductively coded and analyzed for incidents of possible educator cognitive change. Once identified, these incidents were understood both through a contextual lens and through the lens of literature from various disciplines. Although education and neuroscience literature initially provided a conceptual framework for my understanding, literature from cognitive psychology was added as a useful bridge. After understanding individual experiences from the perspective of the participant, I employed an iterative analysis, moving between the data and the literature to situate the experiences within the context of educator cognitive change. This iterative analysis enabled me to create a model of educator cognitive change that is consistent with both the qualitative data of the study and literature in various disciplines. This chapter details the research methods and designs in the

following sections: 1) Qualitative Approach, 2) Data Sources, Collection, and Study Design, 3) Selection of Study Participants, and 4) Data Analysis.

Qualitative Approach

A qualitative approach as situated within interpretive philosophy was used for participant selection and data analysis. An interpretative philosophy is consistent with the study purpose and guided the researcher's understanding of the meaning participants ascribed to their experiences. Since cognitive change is a personal experience which occurs within the individual's mind, it was necessary to discover the thoughts, perceptions, and interpretations of events attributed by the individual. Qualitative data collected from reflective interviews provided the window into participants' emic perspectives in a way that observations or behavioral reports alone cannot.

In interpretivist philosophy the researcher assumes a relativist ontology (Ponterotto, 2005; Williamson, 2006) that values the perceived reality of the individual as central to understanding. The researcher's goal is to achieve an in-depth understanding of the individual's lived experience from an emic perspective (Ponterotto, 2005; Schwandt, 2000). Obtaining such insight requires a detailed analysis of a few individuals who provide a rich set of personal interview data. These small samples are purposely selected on the basis of a potential to yield rich data for the intended phenomenon (Stake, 2003; Williamson, 2006). Thus, this study focuses on a few samples of data selected according to criteria implied by the literature as providing fertile ground for cognitive change.

Interpretivist philosophy posits that understanding is always subjective (Ponterotto, 2005; Schwandt, 2000; Williamson, 2006). The researcher interprets the

meanings of the participant words and actions based upon her/his understanding of the context. Thus interpretation involves attempts to get inside the subject's head using rules, patterns, and conventions of communication (Schwandt, 2000). Such means of interpretation are especially relevant in the synchronous and asynchronous online communication environments in which this study's data was collected. However, the researchers' understandings are always shaded by the inherent expectations, experiences, and biases they bring with them (Williamson, 2006), making verification or consensus of interpretations unlikely (Ponterotto, 2005). This study utilized context, patterns of communication, rules and conventions of chat space interaction, and the conceptual framework of cognitive change drawn from the literature to yield interpretation.

Finally, an interpretive approach relies on inductive analysis (Merriam, 2009; Walsham, 2006). Samples are purposively selected (Williamson, 2006). Analysis begins with open identification of concepts within a single sample (Merriam, 2009; Walsham, 2006). These concepts are grouped as themes that reflect the participant's meaning, the literature, and the researcher's theoretical framework or theory (Merriam, 2009; Walsham, 2006). These themes are then used and appropriately adjusted during the analysis of additional cases so that patterns cutting across samples are identified (Merriam, 2009; Ponterotto, 2005). In this study, an inductive approach is evident in the identification of samples, the creation of analytical codes, and the idiographic and nomothetic analysis.

Data Sources, Collection, and Study Design

This research uses a previously collected set of data for analysis. The data set comes from a unique technology-assisted learning environment known as Experiential Simulations© (ES©). The environment developed by Brunner (2005) was specifically designed as "an innovative leadership preparation approach that provides experiences designed to encourage ontological shifts in its participants" (p. 4). The process engages educators in cognitive conflict by masking identities without participant awareness for the purpose of disrupting typical power relationships in an anonymous, synchronous, virtual environment. Additionally, ES© captures written records of all participant communication in the synchronous chat space and all private reflections and reaction in response to prompts.

Brunner, Hammel, and Miller (2003) reported that ES© may provide the types of shared experience, cognitive overload, cognitive dissonance, and reflections necessary to induce cognitive changes in educators. Findings from several ES© studies (Brunner, Opsal, & Oliva, 2006; deLeon-Denton & Brunner, 2013; Miller & Brunner, 2008; Rusch & Brunner, in press; Shollen & Brunner, 2011) align with previous research demonstrating the potential of virtual learning environments to create conditions that facilitate cognitive change by replicating real-world experiences (Swan & Shih, 2005) and inducing cognitive overload (Whitelock, Romano, Jefls, & Brna, 2000) and dissonance (Garrison, 2003). Within such a learning environment, opportunities for private online reflection help resolve the dissonance (Garrison, 2003), a necessary step for cognitive change to occur (Ertmer, 2005; Kuhn, 1962; Mezirow, Taylor, & Associates, 2009). The following sections describe in greater detail the appropriateness

of ES© data for this study: 1) Experiential Simulations (ES©) Usefulness, 2) ES© Participants, 3) ES© Study Design, and 4) ES© Data Collection.

Experiential Simulations' (ES©) Usefulness

The data from participants in Experiential Simulations (ES©) proves useful for educator cognitive change data analysis for several reasons. *First, ES© leads to instances of conflict and disorientation.* ES© creates a virtual environment in which educators collaborate on problem-based learning tasks without the visual or auditory cues normally used as guides for social discourse (Shollen & Brunner, 2011). ES© achieves this by first masking and then altering participants' identities to represent a gender, race, or class other than their own (Brunner, 2004). Without the visual cues, participants are forced to learn new ways to influence decision-making through assertiveness and amount of participation (Miller & Brunner, 2008). Lacking identifiers typically used for interpreting a collaborative environment, the participants become disoriented in the online environment.

Second, ES© has opportunities for the participants to reflect. These opportunities for reflection provide a chance for educator cognitive change to occur by fostering a transformation (Mezirow, 2000; York-Barr et al., 2006) in participants' understandings of power and identity. During the transformation, ES© participants move from an automatic meaning perspective that views leadership as power over others to a perspective of shared power (Brunner, Hitchon, & Brown, 2002).

Third, ES© collects a rich supply of qualitative data from each participant. Synchronous, online chats record the discussions of group participants in three (3), four- to five-hour problem solving sessions. Additionally, before, in-between, and after chat

sessions, participants engage in ten online written reflective interviews (see Table 1, p. 61). The reflective interviews capture the participants' "*self-conscious* and *reflective* responses to experiences, roles, and actions in the chat space. In particular, the questions evoke responses related to power dynamics, identity, and the decision-making process" (Brunner, 2004, p. 7). The reflective responses capture the lived experiences of the participants in textual format.

Table 1
Sources and quantity of data analyzed.

Data Sources	Questions per interview	Number of **interviews**	Number of **questions**	Number of **chat entries**
Reflective Interviews				
Power & Identity Set 1	17	6	102	
Power & Identity Set 2	10	6	60	
Power & Identity Set 3	16	6	96	
Power & Identity Set 4	10	6	60	
Power & Identity Set 5	8	6	48	
Power & Identity Set 6	14	6	84	
Task Force Work Set 1	7	6	42	
Task Force Work Set 2	8	6	48	
Task Force Work Set 3	8	6	48	
Profile Questions	15	6	90	
Synchronous Chat Transcripts				
Session 1				1,474
Session 2				1,520
Session 3				1,369
TOTALS		**60**	**678**	**4,363**

ES© Participants

The data used in this study was selected from a larger data set of 149 participants who were "graduate students enrolled in one of two leadership courses" (Shollen & Brunner, 2011, p. 158) at a large midwestern research university. The participants (see Table 2, p. 62) in these educator development courses ranged in age from 21-60 years with about 75% identifying themselves as women and about 83% as Caucasian/white (Shollen & Brunner, 2011, p.. 158). The courses used ES© to engage

participants in course-relevent, problem-solving tasks within a virtual, synchronous, chat environment. Each participant signed informed consent forms and were told that they would be involved in an anonymous, online environment where their conceptions of power and identity would be challenged and that they needed to keep their identity hidden the entire time. (Shollen & Brunner, 2011).

Table 2
Number, reported gender, and reported race/ethnicity of participants by group and course type.

Group	*N*	Gender (W:M)	Race/ethnicity (white:of color)
Course 1 - Section 1	15	9:6	13:2
Course 1 - Section 2	12	6:6	10:2
Course 1 - Section 3	11	7:4	9:2
Course 1 - Section 4	9	3:6	7:2
Course 1 - Section 5	8	4:4	7:1
Course 1 - Section 6	7	3:4	5:2
Course 1 - Section 7	10	4:6	9:1
Course 1 - Section 8	9	6:3	7:2
Subtotal	81	42:39	67:14
Course 2 - Section 1	13	13:0	9:4
Course 2 - Section 2	12	12:0	11:1
Course 2 - Section 3	10	10:0	9:1
Course 2 - Section 4	8	8:0	8:0
Course 2 - Section 5	7	7:0	6:1
Course 2 - Section 6	5	4:1	3:2
Course 2 - Section 7	13	13:0	11:2
Subtotal	68	67:1	57:11
Total	149	109:40	124:25

(Shollen & Brunner, 2011, p. 158)

ES© Study Design

Qualitative data is collected from all phases of the ES© process. One part of graduate courses are conducted in online environments using small group synchronous chats and private asynchronous, threaded reflections, or interviews, with the instructor

(see Figure 6. p. 64). Each small group uses problem-based learning on instructor designed tasks. Each group is told to prepare a presentation of its work for the fourth class, which is the class's first face-to-face encounter (Brunner, 2005).

Before the ES© began, each participant is interviewed privately. They were asked to keep their identity hidden and to answer in writing the following questions (10 minutes per question): 1) Define power; 2) How do you make decisions? 3) How do you get things done?

During the first four- to five-hour chat, the students are only identified as an alphanumeric symbol. As they negotiate the chat, they are instructed to omit any information that might reveal aspects of their identity such as race, gender, religion, education, position, or other identity cues. Following this first session, students reflect on the experience through private reflective interview questions posed by the instructor (Brunner, 2005).

Prior to the second chat session, participants are directed to view the photos of their classmates. Each participant is randomly assigned a false photograph to represent them, thus masking their identities. When participants view the photos, they see the masked or pseudo identities of the other group members, but their personal photos are not masked. At this point, participants do not know that a) the pictures of their classmates are not their real identities, and b) they are being represented to others with a false identity. Using this incorrect information about each other, the participants continue to work on the assigned task in the second chat (Brunner, 2005).

After the second chat, participants are again directed to take part in private reflective interviews conducted by the instructor. They then are asked to view an audio-

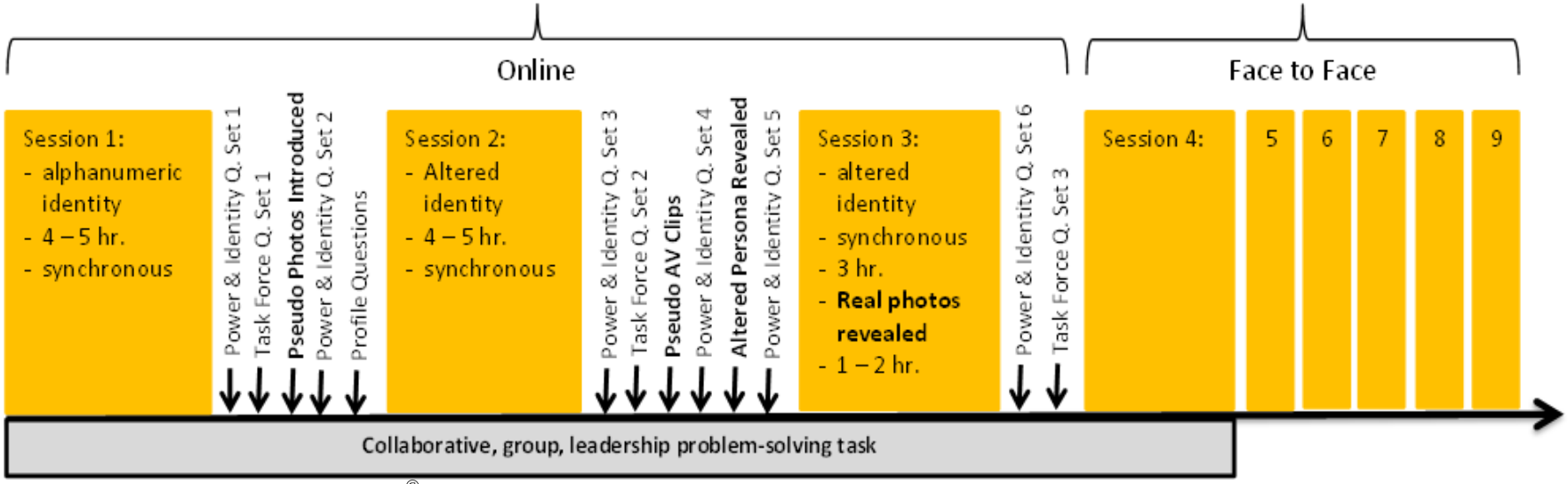

Figure 6. Experiential Simulations© visual model. Displays the configuration of chat sessions, reflections, and modified persona.

visual clip of the group members introducing themselves. As before, the only real depictions are of themselves. Participants are directed to respond to another set of questions. After this fourth reflective interview, participants view the photo that has represented them (Modified Persona: MP) to the others since the beginning. This brings the realization to most that others also have MPs, and that their assumptions of other participants based on their photos is incorrect (Brunner, 2005).

During the third, and final, chat session (one hour before the chat is over) participants are directed to view the actual photos of their group members and record their reactions. They also respond to private reflective interview questions after the session ends. Beginning with the fourth session, students meet face to face. The fourth session begins with participants writing their reactions to seeing the classmates with whom they have been communicating anonymously (Brunner, 2005).

ES© Data Collection

Qualitative data are generated and collected from transcripts of chats and from individual, written (see Table 1, p. 61) reflective interviews. The reflective interviews consist of responses to prompts from the instructor. Six sets of prompts relate to issues of power and identity. Three sets of prompts gather responses to questions about the task and group processing. A final prompt induces reflections on imagined profiles of others in the class. The collected data is recorded and stored within the online course management system.

Selection of Study Participants

This study employed a detailed analysis of ES© participants's data to capture observable phenomena associated with educator cognitive change. Due to the richness,

depth, and quantity of participant data, and in keeping with an interpretive research approach, conducting a detailed analysis required the selection of individual cases likely to display the phenomenon of interest. An initial analysis of chat session transcripts from within a particular course was conducted to select promising cases for full analysis. One superintendency course (15 participants) was selected for the study based upon the recommendation of the course instructor. Nine participants in the course were women and six were men. Thirteen were Caucasian and two were African American.

Before conducting the initial analysis, a literature-based model (see Figure 7, p. 67) for thinking about the chat session behaviors and how they may relate to cognitive change was developed. The model provided a rationale and guidance for the initial coding of chat session comments and the selection of study participants. Further explanation is outlined in the following sections: 1) Conflict-Emotion Rationale, 2) Conflict-Emotion Coding, and 3) Participant Selection.

Conflict—Emotion Rationale

Cognitive change is preceded by a period of disorientation (Mezirow, 1991; Quinn, 1996). This disorientation may be caused by several factors, including 1) cognitive overload; 2) the inability to make sense of information (Weick K. E., 1993); 3) emotional conflict (Bechara & Damasio, 2005); or 4) a loss of self-efficacy (Bandura, 1993) (see Figure 7, p. 67). I reasoned that participants showing signs of disorientation may be candidates for cognitive change, with those experiencing emotional conflict and/or loss of self-efficacy more likely.

Cognitive overload can occur when automatic, implicit schema are not available for use. As a “cognitive miser” (Stanovich, 2009, p. 34), the brain defaults to automatic

processes whenever possible and leaves working memory free for other tasks. Lack of sufficient automatically-recalled knowledge forces the brain to use controlled processes, thus consuming limited working memory.

A lack of existing schema can also lead to *an inability to make sense of a situation*. Sense-making relies on both automatic and reasoned solutions supplied by the meaning perspective. Insufficient memories result in a lack of adequate background knowledge, leaving a vacuum in which the person is unable to make sense of the situation (Weick, 1993).

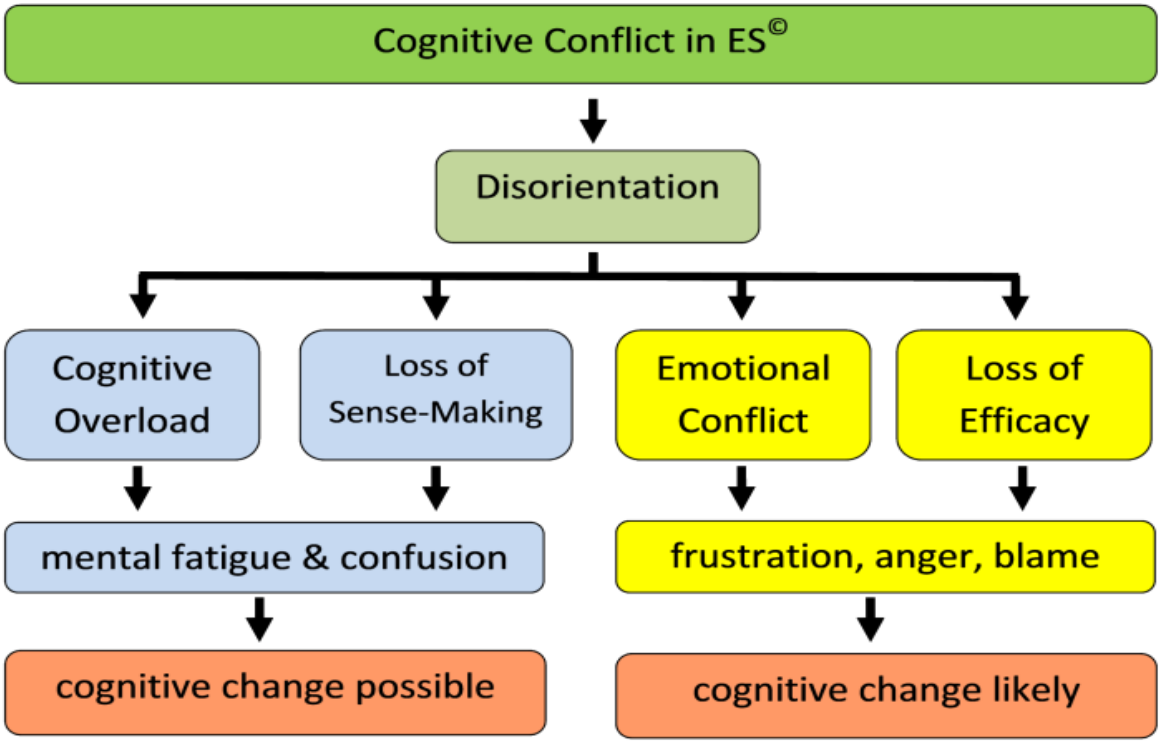

Figure 7. Cognitive Conflict in Experiential Simulations.

During Experiential Simulations (ES©) participants undergo some degree of disorientation. Most participants in ES© experience a loss of sense making and cognitive overload at some point. ES© participants attempt to collaboratively solve educational

leadership problems in the absence of personal identifiers such as age, gender, race, body language, sound of voice, or other identifiers (Brunner C. C., 2005). Normally people rely upon aspects of their own and others' identities to automatically—and often unconsciously—understand and interpret a collaborative environment and guide their behaviors within it. This automatic processing leaves working memory available for manipulating information, considering alternative solutions, and negotiating meaning with others.

Cognitive overload in ES© has two possible sources. One source is the overreliance on controlled cognitive resources for collaborative problem solving in an anonymous setting, due to the lack of available automatic schemas. In addition to the already taxing problem-solving task, participants must also intentionally create new schemas to negotiate the collaborative environment. Such collaborative tasks may include interpreting the meaning of written text, deciding which participants' ideas should be followed, determining how to communicate so as to be heard, and discovering ways to take turns in the conversation.

Another source of cognitive overload is the speed by which processing must occur. The ES© environment had 15 participants. Frequently, in an online chat group of that size, several people will enter information simultaneously, causing multiple entries to appear on the screen in rapid succession. Multiple themes or conversations begin to emerge, simultaneously competing for the participants' attention. Participants are forced to understand and evaluate multiple divergent statements, yet at the same time evoke their own thoughts, devise responses to others, and type them into the computer.

Due to cognitive overload and lack of sense-making, participants in ES© are likely to display evidence of mental fatigue and confusion. These behaviors may be evidence of possible cognitive change. Participants displaying these behaviors may try to slow the pace of the conversation or drop out of it for a time to allow their controlled mental processes to function.

Cognitive overload and a loss of sense-making are likely insufficient on their own to lead to cognitive change. Rather, an inner *emotional conflict* or a *loss of self-efficacy* may be more symptomatic of such change, as these may result from the environment signaling that one's existing meaning perspective is incorrect. Participants in ES© may find that, in the absence of identity cues, the environment does not respond as expected. A person who uses the influence of position, gender, or other status cues to direct decision making may be ignored or criticized in an identity-neutral, collaborative environment. This negative feedback creates fertile ground for cognitive change.

An *inner, emotional conflict* may begin when an error is detected and the rACC is activated. An automatic response to the error is supported by emotional processing neural mechanisms, such as the amygdala and the ventromedial prefrontal cortex (Bechara & Damasio, 2005; Mohanty et al., 2007; Rubia et al., 2003). The rACC signals that an error has occurred (Chiao et al., 2009; Van Schie et al., 2004), and that an analytical override is needed. If the conflict remains unresolved, the person experiences frustration and displays emotional responses such as sadness or anger. The person may attempt to rationalize the heuristic decision *ex post facto,* and may erupt in anger as s/he attempts to justify what feels right but is signaled as wrong.

A loss of self-efficacy may also contribute to the disorientation associated with cognitive change. Bandura (1993) described self-efficacy as "people's beliefs about their capabilities to exercise control over their own level of functioning and over events that affect their lives" (p. 118). Those with strong self-efficacy are willing to engage in challenging mental activities, and view error as a means to grow and an indication that more effort is required. They see themselves in control of the change process and are willing to endure disequlibrium while holding to an expectation of future reward for their efforts. Those with weak self-efficacy consider error an indicator of incompetence, and avoid challenging situations. They feel out of control in the face of change, resulting in anxiety and stress.

Conflict—Emotion Coding

The initial analysis of synchronous chat data presumed that periods of high conflict or high emotion provide external evidence of cognitive change. A 2 x 2 model in which conflict was represented on the vertical axis from low to high, and emotion on the horizontal axis from low to high was created. This resulted in quadrants of 1) low conflict-low emotion; 2) high conflict-low emotion; 3) high conflict-high emotion; and 4) low conflict-high emotion (see Figure 8, p. 71). Each individual chat entry was analyzed within its context and coded according to the corresponding quadrant.

It was important to consider the context of the dialogue to properly code each participant's written response. Literary techniques such as sarcasm, for example, can only be detected within the flow of a conversation. Also, subtle verbal cues needed to detect increasing frustration and emotion may not be evident by looking at individual statements outside of the surrounding dialogue.

Most statements fell into category one (1), low conflict, low emotion. Here are some specific examples of the various other categories of codes:

2 – *high conflict, low emotion:* "Who said we need solutions?" This statement contradicted others in the chat space, resulting in possible conflict.

3 – *high conflict, high emotion:* "Who cares, D. That is not the assignment!" This statement belittles another's comment and uses an expression meant to make one's anger transparent to others.

4 – *low conflict, high emotion:* "Leadership issues" This expression must be read in context to catch the frustration. This is at least the fifth time the

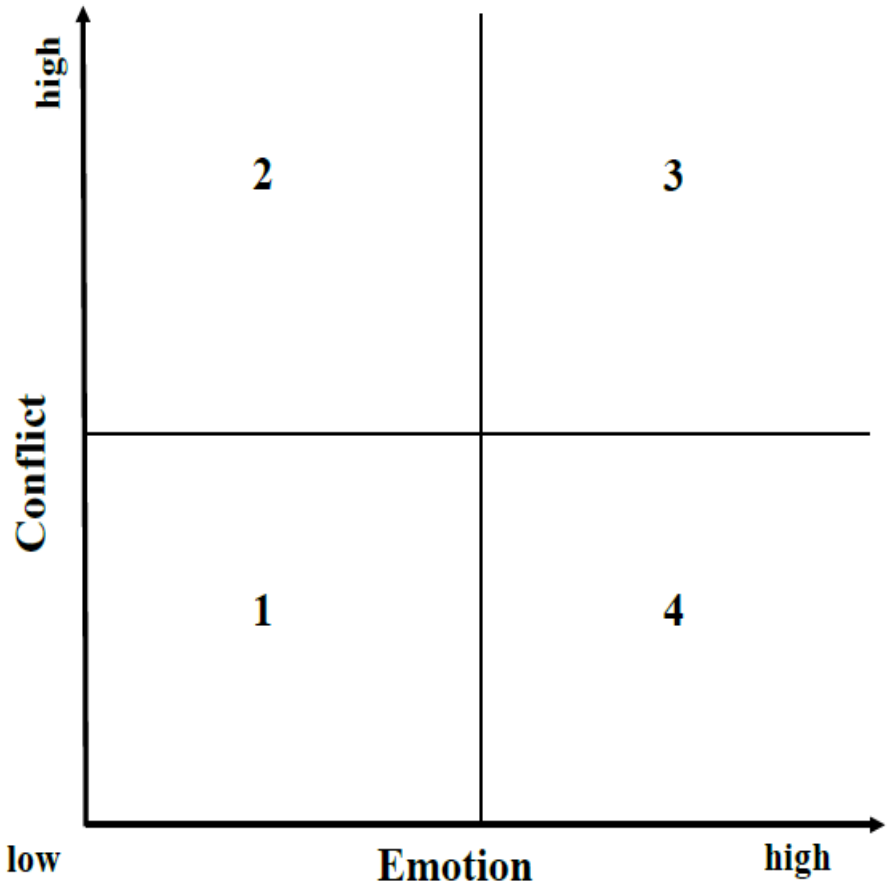

Figure 8. Conflict - emotion matrix.

participant interrupted the flow of the conversation with this, or a similar, statement. While it is not written in a way that causes conflict with others, the recurrent short statement allows the participant's frustration to become apparent.

Participant Selection

A researcher guided by interpretative philosophy uses small, purposefully-selected samples (Williamson, 2006). An initial analysis of three synchronous chat transcripts was performed in this study to identify individual participants or cases whose interviews and reflections might yield useful cognitive change data (see Table 3, p. 73). Two types of cases were selected for further analysis, those who appeared likely to experience cognitive change and those that did not appear likely to experience such change. The latter group was chosen to serve as a baseline and as a possible source of anomalies and contradictions.

Participants participate in an online synchronous chat by entering text via a keyboard and striking the enter key when done. Upon striking the enter key, the participant's text is displayed in the running transcript on the screen in order received for all participants to view and read. Each participant's entered text is an individual "entry." To identify the most and least likely cases to serve as illustrative cases of cognitive change, each participant synchronous chat entry was categorized as displaying conflict and/or emotion as outlined in the previous section. Chat transcripts revealed conflict through sarcasm, frustration with oneself or others, blame, or accusations. Statements of emotion projected irritation, anger, frustration with the task, or excitement.

Table 3
Summary: participants' transcript data from online chat sessions 1 – 3.

Participants	Participant entries(n)	% of total[a]	Low conflict low emotion		High conflict low emotion		High conflict high emotion		Low conflict high emotion	
			Entries	(% of n)	Entries	(% of n)	Entries	(% of n)	Entries	(% of n)
Participant *	162	(3.7%)	145	(90%)	8	(5%)	3	(2%)	6	(4%)
Participant *	162	(3.7%)	160	(99%)	1	(1%)	0	-	1	(1%)
Participant *	177	(4.1%)	172	(97%)	4	(2%)	0	-	1	(1%)
Participant *	186	(4.3%)	177	(95%)	4	(2%)	0	-	5	(3%)
Participant *	187	(4.3%)	182	(97%)	4	(2%)	0	-	1	(1%)
Participant *	196	(4.5%)	191	(97%)	4	(2%)	0	-	1	(1%)
Participant *	227	(5.2%)	219	(96%)	2	(1%)	0	-	6	(3%)
Participant *	242	(5.5%)	236	(98%)	3	(1%)	0	-	3	(1%)
Participant *	279	(6.4%)	274	(98%)	5	(2%)	0	-	0	-
Participant *	337	(7.7%)	323	(96%)	4	(1%)	2	(1%)	8	(2%)
Participant *	341	(7.8%)	342	(98%)	15	(4%)	6	(2%)	32	(9%)
Participant *	349	(8.0%)	342	(98%)	5	(1%)	1	-	1	-
Participant *	480	(11%)	407	(85%)	32	(7%)	17	(4%)	24	(5%)
Participant *	519	(11.9%)	392	(76%)	34	(7%)	51	(10%)	42	(8%)
Participant *	519	(11.9%)	502	(97%)	8	(2%)	4	(1%)	5	(1%)

Note. Participants are unidentified to preserve anonymity and are ordered according to overall participation (low to high).
[a]total = 4,363, or total entries for all fifteen participants. If all participants had equal participation, each would contribute 1/15 (6.7%) of the entries. The horizontal line distinguishes those with less than 6.7% participation from those with greater.

After coding each participant entry according to the conflict-emotion matrix, the participant's number of coded entries for each quadrant category in each chat session was tabulated. Next, the participant's ratio (listed as a percentage) of entries coded in each category was calculated. For example, in the first chat session alone, one participant had 154 total entries. Of those, sixty-eight were coded as category one (44%), 25 were category two (16%), 37 category three (24%), and 24 category 4 (16%). I also calculated the relative participation level of each participant. In comparison to the other 14 participants in the first chat session, the participant just referenced comprised 10.6% of the total entries.

After all three chat sessions were analyzed for conflict and emotion, the coding for the 4,363 total chat entries was aggregated. This provided an overall picture of each participant's experience across the three chat sessions. The aggregated results were used to select individual cases for in-depth analysis. Participants were selected according to the following criteria: 1) they were highly engaged, and 2) they either displayed high conflict and/or high emotion or low conflict and low emotion. Those with high conflict and/or high emotion were considered more likely to be candidates for cognitive change, and the others were to serve as a baseline.

High engagement was determined by an individual's relative participation in the chat space. The assumption was made that those with the greatest relative participation were more likely to be invested in the process and yield rich reflection data. Relative participation was represented as the ratio (percentage) of a participant's aggregate number of chat entries relative to the group's total aggregated chat entries. The percentage of individual chat participation ranged from a low of 3.7% (162 of 4,363

comments) to 11.9% (519 of 4,363 comments) with a median participation of 5.6%. In order to be considered for individual analysis, participants needed to reach a participation threshold greater than 1 out of 15, or 6.7% (see Table 3, p. 73).

The relative frequency of each individual's coded responses was used to identify those who displayed high conflict and/or high emotion, and those whose did not. High conflict and/or high emotion were represented by codes 2, 3, and 4. The ratio of the high conflict and/or high emotion (all entries coded 2, 3, and 4) responses to total responses for each participant was recorded as a percentage to identify her/his level of conflict and emotion. Participants' percentages of high conflict and/or high emotion entries ranged from 1% to 24%, with both a median and mode of 3%. Likewise, the ratio of the low conflict and low emotion (code 1) responses to total responses for each participant was calculated. Participants' percentages of comments coded as 1 ranged from 76% to 99% with a median of 96% and a mode of 97%.

This initial analysis was useful to select the individual cases (see Table 4, p. 75).

Table 4
Aggregated chat session data: six cases selected for analysis.

Participants	Entries (n)	% of Total[a]	LC-LE[b]	(% of n)	HC-HE[c]	(% of n)
High conflict / high emotion						
Participant 1	519	(12%)	392	(76%)	127	(24%)
Participant 2	341	(8%)	288	(84%)	53	(16%)
Participant 4	480	(11%)	407	(85%)	83	(15%)
Low conflict / low emotion						
Participant 3	349	(8%)	342	(98%)	7	(2%)
Participant 5	337	(8%)	323	(96%)	14	(4%)
Participant 6	519	(11%)	502	(97%)	17	(3%)

Note. Selected participants were assigned random numeric pseudonyms for anonymity.
[a]Total = 4,363, or total entries for all fifteen participants. If all participants had equal participation, each would contribute 1/15 (6.7%) of the entries. Selected participants contributed greater than 6.7% of the entries.
[b]LC-LE = number of entries coded for *low conflict and low emotion.*
[c]HC-HE = number of entries coded for *high conflict and/or high emotion.*

First, only those with high engagement, or greater than 6.7% of total chat entries, were considered for selection. Among those determined to be highly engaged, the three participants with more than 10% of their chat entries identified as high conflict and/or high emotion (less than 90% low conflict and low emotion) were selected as likely to undergo cognitive change (see Figure 9, p. 76). The three participants with over 90% of their chat entries identified as low conflict and low emotion were selected for baseline comparison. The result of the initial analysis yielded six participants who warranted further study. They were randomly assigned numeric identifiers (1 – 6) to maintain participant anonymity. Five were white and four were women (see Table 5, p. 77). The conflict and emotion categories used to select cases were for initial analysis of the chat transcripts only and were not useful for the in-depth analysis of the six cases.

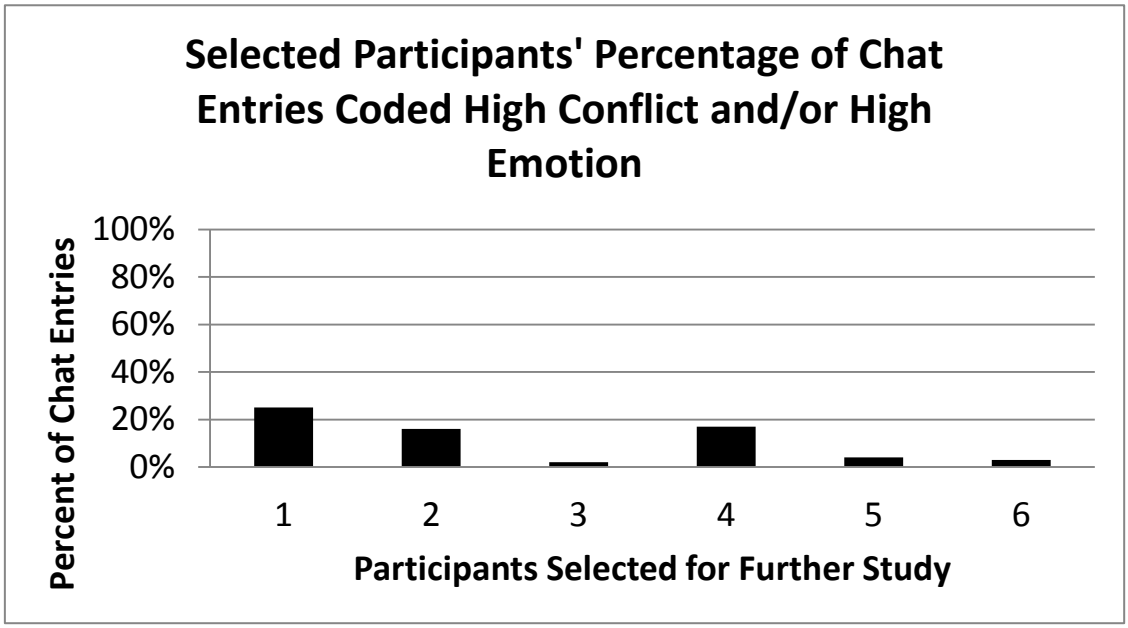

Figure 9. High conflict and/or high emotion coding: six selected participants.

Table 5
Race and gender: cases selected for analysis.

Participant	1	2	3	4	5	6
Race	White	Black	White	White	White	White
Gender	Female	Female	Male	Female	Female	Male

Data Analysis

Analysis of the six selected cases began with the selection of one case. All ten reflective interviews of participant 1 were read and analyzed. This approach allowed me to "obtain a general sense of the information and to reflect on its overall meaning" (Cresswell, 2009). Using an open coding process, concepts were allowed to emerge from the data based upon the participant's own words (Merriam, 2009; Walsham, 2006). Themes were inductively created from the various concepts. Some themes related to the participant's attitudes and emotions, specifically *anger, annoyance, blaming, confidence, frustration,* and *joy* or *excitement*, came to light. Additional themes emerged that were related to the purposes of the superintendency course and the Experiential Simulations©, such as *influence, leadership, power,* and *identity.*

Relevant literature further refined the understanding of the themes. One purpose of ES© is to study of conceptions and use of power. Brunner's work (2002, 2005) was helpful here. Brunner's (2002) aggregated, literature-based definition of "power over" (p. 696), and "power with/to" (p. 699) was adopted for data analysis purposes. Thus, *power over* and defined it as "power conceived as dominance, authority, control, influence, or power over others of things" (Brunner, 2002, p. 696). P*ower with/to* was defined as "the capacity to accomplish certain social goals through cooperation among people or groups with various interests and concerns" (Brunner, 2002, p. 699).

Interpretive research acknowledges the role that both research purpose and theory play in shaping the focus of analysis (Walsham, 2006). Themes emerge not only from the data, but also from the corresponding literature (Cresswell, 2009). Thus themes related to educator cognitive change were evident. The conceptual framework (pp. 50 – 55) of educator cognitive change suggested by the review of neuroscience and education literature provided a useful lens for understanding the data and naming themes. The conceptual framework and its related literature suggested themes such as the detection of *anomalies* (Kuhn, 1962), *disorientation – loss of sense making* (Weick, 1993), *efficacy* (Bandura, 1993; Mezirow, 1991), *willingness – openness to change* (Dewey, 1933), *reflection* (York-Barr et al., 2006), and *resistance* (Barnard, 1938).

Cognitive psychology proved a useful bridge between education and neuroscience as suggested by advocates of a transdisciplinary approach (Blakemore & Frith, 2005; Szucs & Goswami, 2007; Willingham & Lloyd, 2007). Therefore, the literature was expanded to include cognitive psychology, which provided a richer perspective. Work by cognitive psychologists Stanovich and West (2008a) suggested that *background knowledge for problem solving* is also important to overcoming biases, so this was added as another theme. A listing of the themes and their definitions are found in Appendix A.

After the participant 1's reflective interviews were exhausted, the identified themes were used to analyze the other five participants' reflective interviews. Analysis of subsequent participants' reflections prompted narrowing some themes into subthemes (Merriam, 2009). For example, participants wrote about *influence* in their reflections. Sometimes they wrote about their own influence or about other people's

influence. This led to the creation of the following subthemes: *perception of other's influence* and *self-perception of influence.* Participants further evaluated their own and other's influence as being positive, negative, or ineffective. The participants' evaluation prompted the creation of additional subthemes – *negative influence, positive influence,* and *lack of influence.*

The data were organized for analysis using a commercial software product (NVivo). The software allowed data grouping by themes. By coding participants' words according to their themes, subtle changes in participants' understanding of concepts like identity, leadership, and power were able to be detected. The software was also useful to create frequency tables detailing each participant's coded responses (see Table 6, p. 80).

The frequency table enabled comparisons between participants' experiences, understandings, and behaviors both within and between individuals. For example, the number of statements for participant 1 coded for *resistance* (54) could be compared to her statements coded for *openness* (0). Similarly, the number of participant 1's statements that were coded for *reflection* (5) were able to be compared to the number for participant 3 (61). Thus possible relationships between the frequencies of coded statements could be explored using correlations (Pearson's r). For example, there was a strong correlation (r = .87) across individuals between the number of instances coded for openness and the number of instances coded for reflection. In this way coding and some initial analysis occurred simultaneously (Corbin & Strauss, 1990) as the process of categorizing participants' words highlighted their experiences and understanding of

concepts like the use of power, openness or resistance to change, and evidence of individual cognitive changes.

Table 6
Emergent themes: coding frequency per participant.

Code	Emergent Themes	Participants					
		1	2	3	4	5	6
1	anomalie	2	2	7	2	5	2
2	attitude-emotion	43	20	21	30	34	34
2.1	anger	5	1	0	0	4	2
2.2	annoyance	9	1	2	3	6	2
2.3	blaming	9	0	1	6	3	7
2.4	confidence	7	7	5	10	12	4
2.5	frustration	13	3	7	11	7	16
2.6	joy-excitement	0	7	6	0	2	3
3	background knowledge for problem solving	7	14	16	1	2	14
4	change evidence	0	3	5	1	0	0
5	cognitive conflict evidence	0	5	2	3	3	21
6	disorientation-loss of sensemaking	0	4	6	2	4	3
7	efficacy	19	15	19	4	23	27
7.1	negative efficacy	1	1	0	1	17	8
7.2	positive efficacy	18	14	19	3	6	19
8	identity	5	34	38	25	24	10
8.1	general conceptions of identity	4	24	32	19	21	8
8.2	self-perception of identity	1	9	6	6	3	2
9	influence	36	27	41	19	24	31
9.1	perception of other's influence	21	12	23	7	19	21
9.11	exerting influence-other's ability	10	8	18	6	19	20
9.111	negative influence - others	2	3	7	3	9	6
9.112	positive influence - others	8	2	11	3	10	14
9.12	lack of influence - other's ability	11	3	3	1	0	1
9.2	self-perception of influence	15	15	18	12	5	10
9.21	exerting influence-self-perception	15	12	12	7	2	9
9.211	negative influence - self	6	2	0	2	0	5
9.212	positive influence - self	9	10	12	5	0	4
9.22	lack of influence - self-perception	0	3	6	5	3	1
10	leadership	32	27	22	17	23	25
10.1	general conception of leadership	14	20	15	9	17	8
10.2	self-perception of leadership	18	7	7	8	6	17
11	openness-willingness to change	0	13	35	0	14	23
12	power	38	25	54	26	40	35
12.1	power over	34	10	7	9	10	21
12.2	power with-to others	4	15	47	17	30	14
13	reflection	5	30	61	6	44	24
14	resistance	54	2	4	11	0	19

* Indented categories represent subthemes.

CHAPTER FOUR:

DATA ANALYSIS AND FINDINGS—RESEARCH QUESTION ONE

The two-fold purpose of this exploratory qualitative dissertation is: 1) to gain a transdisciplinary understanding of educator cognitive change, and 2) to use that understanding to develop a model of educator cognitive change. This study, then, seeks to answer the following questions:

1. How might qualitative data be analyzed to capture observable phenomena associated with cognitive change?
2. How might an original model that incorporates education and neuroscience literature provide explanation for educator cognitive change?

The analysis and findings outlined in this chapter answer the first research question and provide the understandings necessary to develop an original model illustrating the dynamics of educator cognitive change.

Exploratory research such as this requires both openness to the research setting and reflection—so the researcher sees what the data is actually revealing rather than imposing a premature structure upon it (Wolcott, 2009). Lather (1986) described this kind of an iterative approach to data analysis and theory creation:

> Building empirically grounded theory requires a reciprocal relationship between data and theory. Data must be allowed to generate propositions in a dialectical manner that permits use of *a priori* theoretical frameworks, but which keeps a particular framework from becoming the container into which the data must be poured. (p. 267)

Consistent with Lather's approach, I first examine each selected case independently, allowing the individual's experience to unfold according to the emergent themes. Then I aggregated the data across individuals to look for patterns and compare it to the education and neuroscience literature. I conclude the chapter by discussing important findings.

This study of cognitive change is limited to the data recorded by participants in three chat sessions and ten written reflections submitted over approximately six weeks as part of an insructional process known as Experiential Simulations© (ES). This ES© occurred in the fall of 2002 as part of a graduate-level superintendency course from a major research university in the Midwest. The analysis is organized according to the following sections: 1) Ideographic Data Analysis, 2) Nomothetic Data Analysis, and 3) Findings.

Idiographic Data Analysis

I begin my analysis with an idiographic analysis of each participant's experience based upon the emergent themes as coded in their reflective interviews. The idiographic analysis enables me to gain an understanding of the phenomenon from the individual participant's perspective without trying to fit the data into a given framework (Ponterotto, 2005; Schwandt, 2000). I conclude each individual participant analysis with a brief summary that frames each person's experience as it relates to the topic of educator cognitive change. The participants are discussed in turn according to the following sub-sections: 1) Observations about Participant 1, 2) Observations about Participant 2, 3) Observations about Participant 3, 4) Observations about Participant 4, 5) Observations about Participant 5, and 6) Observations about Participant 6.

Observations about Participant 1

Anomaly. (2 instances) Participant 1 reported few surprises. She was surprised that she preferred the chaos to the slow-paced deliberate work in the chat space. She was surprised that the group actually worked together to accomplish their task force work.

Attitude – emotions. (43 instances) The second most notable trait of participant 1's reflections, as far as amount of text and entries are concerned, was the emotions she expressed. Forty-three references to emotions were coded—more than any other category. Of those 43, about half were expressions of **annoyance** (9) and **frustration** (13) while none were expressions of **joy or excitement** (0).

Annoyance. (9 instances) Participant 1 was annoyed by the slow pace of the task force work. She ascribed the slow pace to efforts to appease others and make them feel included. She called those who wanted to include everyone "people persons," and complained that "they like to blur social time and work." She was also annoyed by the secrecy of the masked identities, calling it "cloak and dagger." In the end, she refused to answer an entire set of profile questions stating, "I love ya, [instructor], but I can't do it. I have about a million better uses for my time."

Frustration. (13 instances) Throughout the reflections, participant 1 expressed frustration about the process. She wrote,

> It became chaotic again and that was irritating. I felt like my group was very task oriented, we were done… and then we sat there while everyone else

> micromanaged the task to DEATH & I really have not liked this process. I think it makes me feel too limited and one-dimensional. It took all the fun out of work.

She was also frustrated by the others with whom she had to work. She wrote, “There were still the people who like to micro manage to my macro. There are still the talkers and the feelers and the do-gooders in every group. Barf. I was irritated beyond measure.”

Anger. (5 instances) On occasion, participant 1 used expressions which revealed that her emotions rose to the level of anger. Some examples include, “I might punch 6 right in the face,” and “I also do not like being told to back off. Get out of my way if I’m too close.”

Confidence. (7 instances) Participant 1 seemed to remain confident in her approach and abilities. She frequently expressed that her abilities were responsible for the group success: “They need to know that I am always right. Then we would be done by now with a product and moving forward.” She also stated, “Too many people abdicate their personal creativity, energy and power by being passive, hesitant, people pleasers or followers. So I step in. Many times, as in this session, no one seems to mind.”

Blame. (9 instances) While participant 1 was ready to take credit for group success, she was also ready to blame others when things went wrong. She blamed her classmates in general: “That’s not the part that bothered me. It was the nit-picking and going in circles.” She blamed participant 6, who emerged as a rival leader. “6 reminds me of a PE teacher who likes to tell everyone to run the mile, but you’re not so sure

they could do it themselves. Bad leader? No, but resented maybe." She also blamed the instructor. "Where was [instructor]? Why did I have to waste my time with a bunch of bozos on a topic I could care less about?"

Background knowledge. (7 instances) Participant 1 discusses two types of background knowledge which she uses to negotiate group tasks. One is her knowledge of people's abilities and strengths to help her assign tasks and accomplish work. She wrote, "I only need to know who can do what and how they can contribute to getting things done." The other is that she uses nonverbal and verbal clues by group members to let her know whether she is communicating effectively. Based upon those cues, she adjusts her behavior: "A smile from a friend or wink from a supporter can really help me find positive ways to get my way." Although she possessed those two skill sets, they were not very helpful to her in an anonymous, online chat environment.

Change evidence. (0 instances) Participant 1 had no expressions of a change in her thinking, understanding, or acting.

Cognitive conflict. (0 instances) Participant 1 did not describe any situations that indicate she experienced a conflict between what she expected and what she experienced.

Disorientation – loss of sense making. (0 instances) Participant 1 did not acknowledge being confused or unsure how she should proceed at any time.

Efficacy. (19 instances) Participant 1 expressed a confidence in her ability to lead the group and carry out the assigned tasks. She recognized that her style is pushy and abrasive, but felt it was necessary to get the tasks done and, in the end, appreciated

by others. Of the 19 references to her efficacy, 18 displayed a strong sense of positive self-efficacy, and only one might be considered a negative reference.

She felt very strongly that it was her work that enabled the group to succeed. She wrote: “I would have done it all myself and saved everyone else from the drudgery. I would have been thanked profusely as everyone else has something more important to do for the welfare of the children in our district.” In her last reflection she stated, “So I offered and demonstrated and did it myself. Here! Done! Enough already.”

Identity. (5 instances) For participant 1 identity comes from personality and from ability to manipulate rather than from one’s race, gender or position. In fact, she downplayed the role that identity, or lack of it, plays in day-to-day interaction and in the chat space. “I did not find identity to be an issue just yet…Actually, if talent and strength is an identifier, that was a huge hindrance.” Participant 1 seemed to believe that behavior and personality are more important indicators of influence than identity. She wrote, “I may not stop doing ‘X’ annoying or provoking behavior because the person is male/female/whatever identifier, but I may adjust my behavior because a person is angry, scared, hesitant, or amused.”

At the end of the experience, participant 1 interpreted her own feelings of isolation after real identities were revealed as arising from people’s prior experiences with each other rather than identity according to race and gender.

Influence. (36 instances) The idea of influence is quite important to participant 1. She viewed herself as carrying a lot of influence in the group and on the task, both positive and negative. It appears that she did not care whether her influence was positive or negative, as long as it served her purpose. She penned the following:

> Why should you listen to me? Because I took all the ideas YOU ALL offered and made it a workable list. It was not a perfect list, but most people recognized it as their work. Once they were with me on the vision, I could push it forward with less hassle.

Participant 1 took time to carefully describe her view of everyone else's personalities and their ability to influence the group. She saw most participants as lacking influence and seemed to respect the influence of only a few. Besides herself, she viewed 3, 4 and 5 as being good influences. She recognized the strong influence of 6, but fiercely resented it.

> 6 bugged me in session one. It was like they waited for the flames to get high, then jumped in and said, 'I will save you!' and everyone went 'ooh, yes, thank you 6, we needed some leadership!' No. That's manipulation.

Later, participant 1 acknowledged her own influence as manipulation, stating, "It was manipulative. Hey, no wonder 6 bugs me. Maybe they think like I do! I can tell you though, I would never have made that process so damn slow and dull."

Leadership. (32 instances) Participant 1's conception of leadership remained consistent throughout the three chat sessions and reflections. From the start she stated that leadership is about getting people to accomplish a task. The leader takes control, finds out who can contribute to the task, motivates others through any means possible, and does the work her- or himself if necessary. Her three most commonly used words when writing about leadership were "task" (9), "work" (10), and "done" (14).

In her first reflection, she stated, "In this, a business or work setting/task, I only need to know who can do what and how they can contribute to getting things done."

About leadership she says, “As a leader, I would play favorites with the people who bought into my vision and supported me in getting things done.” In her final reflection she summarized her leadership as, “I’m a pain in the ass that gets things done.”

Openness – willingness to change. (0 instances) Participant 1 did not have any expressions that indicated openness to being wrong or to others’ ideas. She also did not express a willingness to change her approach.

Power. (38 instances) Participant 1 is well-practiced in using power over (Brunner C. C., 2002). She described a variety of ways she exerted her will on others: “In session 1 I played the big picture task master role. I also played the stupid and repetitive idea police. But in session 2 I played the lead by example role . . . Once they were with me on the vision, I could push it forward with less hassle.”

Participant 1 is also used to having her way, either by doing the work herself or getting others to abdicate their decision-making to her: “I would have done it all myself and saved everyone else from the drudgery . . . I may have convened the group for feedback/corrections, just to be politically correct, but I would have entertained little input.”

Participant 1 perceived power with/to as weakness and not legitimate power. “Too many people abdicate their personal creativity, energy, and power by being passive, hesitant, people pleasers or followers. So I step in.” She writes elsewhere, “It doesn’t matter what you call it, waiting for someone else to take control of a situation is not leadership.”

Participant 1 recognized that her power over approach was not acceptable to most. Her language mirrored the pattern of women superintendents’ unsettled

discussion about power (Brunner C. C., 2000). Brunner (2000) found that many women superintendents are uneasy or apologetic when they describe using power in a traditional, power over manner. Similarly, participant 1 described her behavior in the chat space as unacceptable. “I was little more than a pain in the ass. I had some really good ideas, but no patience for the process or input of others.” She noted how others reacted to her use of power by saying, “I do believe that being called a bitch has more to do with approach than gender.” She seemed familiar with efforts to silence her (Brunner C. C., 2000). “I suppose I’ll push fewer buttons in person. Body language and eye contact make a difference.”

Participant 1 provided what Brunner (2000) described as “settled discourse” (p. 78) about her use of power by justifying her actions for the greater purpose of completing a task. “It’s about the task. Do your work, pull your share of the load and you are OK with me.” She explained that people’s feelings and need for input were subservient to the task. “This task is not about me. It’s work. It’s not personal.” She even went so far as to say, “I do not care who they are. I hope I am not a very evil person for saying that, but it is true. It’s a work group.”

Participant 1’s view of her use of power remained unchanged throughout the chat sessions.

Reflection. (5 instances) Participant 1 rarely gave evidence of reflection upon the process or herself. When she did, the reflections were on a superficial level related to behavior. Her most interesting reflection was also her shortest. She envisioned the chat sessions as a fighting match in which every person was in it for themselves. After

the third chat session, she surprised herself by realizing that as she looked back, the group actually worked together to accomplish the task.

Resistance. (54 instances) This was by far the most common trait of participant 1's reflections. She was unwilling to consider that identity, or lack thereof, played a role in their inability to work efficiently. In response to questions about identity, she was consistent in claiming that it was not the problem: "I don't think the lack of identifying characteristics was the problem."

She claimed that there was nothing to be learned from the ES© experience. "It was interesting, but so unrealistic as to be of little value." Participant 1 denied the reality of the photos and refused to speculate on how they affected the group interaction. "I refuse to accept the implication that people look like their personalities, especially in their photos. AND I still don't think they are real." She later added, "Man, I really feel bad about this, but I have no reaction at all. I don't believe the identities match the group letters."

When asked to reflect on how the masked identities may have influenced the way people reacted to her, she appeared not to engage in the question deeply.

> I did not see any changes in how I was reacted to. I got a smattering of support here and there. People were willing to follow my lead on things equally each week. I got shot down for being rude each week too. Nothing changed as far as I could tell.

She added, "Seriously, the picture thing was no big deal."

In her final reflection she explained that she would not have changed anything about her approach. In fact, she desired that she could have simply "done it all myself

and saved everyone else from the drudgery." She determined that she did not learn anything from the experience.

> I do not feel like I have learned or gained anything. I'm a pain in the ass that gets things done. Others are who they are, no matter what context you put them in. You still have to deal with extreme differences. No news flash there.

In the end, she simply refused to engage at all, writing, "[Instructor], I started this but cannot finish … I have about a million better uses for my time."

Participant 1 summary. Participant 1 gave no indication of cognitive change. Throughout her reflections, she described leadership as getting people to accomplish a task. Her three most commonly used words when writing about leadership were "task" (9), "work" (10), and "done" (14). For her, it doesn't matter how the leader accomplishes the task as long as it is completed.

Participant 1 brought her use of power over from the real world into the chat space. She described power with/to as weakness and justified her power over approach by de-personalizing the work: "This task is not about me. It's work. It's not personal." In addition, she downplayed the role that race, gender, and position play in generating power and instead elevated the influence of personality and forcefulness.

Participant 1 did display some characteristics associated with a change potential. She expressed considerable annoyance, frustration, and anger. However, she did not reveal possible cognitive conflicts or disorientation. Instead, she seemed to be very much in control. She described herself as full of positive self-efficacy and seemed to believe that she alone was the chief agent of success in group tasks. She asserted, "I would have done it all myself and saved everyone else the drudgery."

The most prominent feature of 1's reflections was an attitude of resistance. Participant 1 recorded 54 examples of resistance. She refused to engage in speculation on the role of identity. She denied that the photos were her real classmates, which they weren't, and she refused to answer her last set of reflective questions about participant profiles, commenting, "I started this but cannot finish . . . I have about a million better uses for my time." In the end she stated, "I do not feel like I have learned or gained anything,"

Observations about Participant 2

Anomaly. (2 instances) Participant 2's only surprise occurred during the first chat session when she found that people did not show an interest in her ideas or suggestions. It surprised her because at work people value her input and even "consult" with her on important decisions: "This I found to be frustrating and not typical of my daily work." She attributed this to people in this anonymous setting not knowing her skills and abilities.

Attitude – emotions. (20 instances) The most common attitudes or emotions Participant 2 displayed were ones of **confidence** (7 occurrences) and **excitement** (7). She began the project with enthusiasm. She wrote in her introduction to session one, "I'm really excited about this." She ended similarly by stating in the final reflections, "Wow! The readings were great. I really thought the articles were appropriate and that they applied to the work that I do every day." She further stated in her final task force questions, "I believe that the work that we started will give us a firm basis for the future work we have to complete."

Participant 2 experienced some brief moments of **frustration** during session one and after seeing that the photo that represented her was not real. Participant 2 revealed herself in the interviews as a black woman and the pseudo picture that represented her to others was a white woman. “People were not seeing me! They were seeing a representation of me chosen by someone else.” She displayed **annoyance** and **anger** only once. She never blamed anyone else for her frustrations.

Background Knowledge. (14 instances) Participant 2 frequently talked about her past experiences and how they could apply to the chat room work. She even discussed things she learned in the chat room that she took with her to work. Throughout the interviews, participant 2 was consistent her background knowledge and how she applied it. She expressed background in (1) equity and inclusiveness, and (2) imposing a structure to ensure focus and inclusiveness. After session two she stated, “A system was created to give people a voice and to work in small groups.” In preparation for session four, the face-to-face session, she said, “I do know that we can work more efficiently if we use tools that assist groups with their work, i.e. group norms, action plans, etc.” She also explained how she applied her leadership in a work related task force to this online course. She explained, “How important it is to be prepared and to know what work you want to accomplish. And most important! … recognize the contribution of others.”

Change evidence. (3 instances) Participant 2 described new things she learned as a result of this experience. She described new actions she employed in her work settings. “I found myself talking less and listening more as well as asking people to give me feedback on how I sway decisions.” She also described a change in her view of

inclusion in regard to decision-making honoring people's voices. "I've learned that inclusion is really important…How we allow time for people to process and respond is important." Finally, she stated, "I am more conscious of how I interact with people, especially when we are making decisions about the work that we do for students."

Cognitive conflict. (5 instances) Participant 2 reflected on three instances in which she experienced conflict between what she expected and what actually occurred, and she experienced stress. The first was during session one when none of the participants paid attention to her "excellent" suggestions. She responded by shutting down. "I sat back for a while and read responses from others wondering if my absence would be noticed; it wasn't….Then I became angry and didn't "play" at all."

She next experienced conflict when she saw the pseudo picture representing her. The third incident occurred when she saw everyone's real photos and realized her conceptions of others were all wrong. She again responded to the conflict by withdrawing from conversation and reflecting to help her reconcile her past assumptions with the new reality. She explained, "I actually could not respond on the computer for a moment. It wasn't shock so much as needing time to think about what I said and how I said it in previous sessions."

Disorientation – loss of sense making. (4 instances) See "cognitive conflict." Participant 2 also experienced a loss of sense making during session one, when no system was in place to focus their discussion.

Efficacy. (15 instances) For participant 2 efficacy is a matter of inclusion and being recognized by others for one's contributions. In session one, no one paid attention to her suggestions. Her self-efficacy plummeted, and she felt she could restore it "if in

fact we could identify ourselves" or "create some system for gaining input from everyone as well as some order." Without those two means available to her, she restored a measure of personal control by being "obstinate":

> I decided to use some power and not respond to the group when inquiring about signing off. And I refused to exit the system until 6 and others had done so. Individuals who feel powerless will find ways to gain power.

During session two, participant 2's efficacy was restored when a system was put in place to ensure order and equity, and others paid attention to her input and used some of her suggestions. By the end of session two, participant 2 reported being "encouraging to others as well as giving my input with a level of confidence and trust in my answers," and "actually looking forward to other creative ways of interacting." Her experiences and efficacy from her work environment was now matching those in the chat space. She expressed her feelings of control by claiming she can make "tough decisions" and "be stubborn and keep at it until I get what I want."

Her efficacy took a brief hit when she realized that the newfound recognition and acceptance she enjoyed in session two coincided with her classmates' image of her as a white woman. She admitted, "I believe that after my picture was revealed there was a subtle difference" in the way she was treated. However, she regained efficacy by asserting her pride in her "heritage and gender," and reframed this as an opportunity to surprise others when they learn "who the real 'Participant 2' is." She stated, "I am a strong African American woman – hear me roar!" Although she acknowledges it is out of character for her to do so, after her true identity is revealed to the class, she bolsters her efficacy further by subtly chastising them for giving her a greater voice when they

thought she was white. “I did find a little pleasure in attempting to bring some level of discomfort to others by making the following statement: ‘I wonder if others would respond differently if they knew color and gender?’”

Participant 2 longs for her efficacy to be based upon merit. She revealed she wanted the others to know what she knows, that she has “had experiences and knowledge that should be considered. I have influence!” The most important thing she takes away from her experience is “that inclusion is really important.”

Identity. (34 instances) At the beginning of the course, participant 2’s conception of power was tied to identity as demonstrated by race and gender, followed by work position or title, and experiences. This conception remained constant throughout the course.

In her first set of Power and Identity questions, participant 2 described the need to know one’s race, gender, and experiences/positions so she could “know how to play (the game).” She was critical of both 1 and 6 for their directive leadership and declared that 6 was probably “either a white male or an assertive white female.” After the pseudo photos were revealed, she stated she also thought 1 was a white female.

Participant 2 felt powerless in the first session and wished that others knew her identity, saying, “Others may want to know my gender and race. They will also want to know what position I hold and where.” She believed that if they knew those things, they would have given her a greater voice.

After the real photos were revealed, she maintained that participants would have reacted differently to her input if they had known her to be an African American woman. She believed they would have been artificially inclusive to prove they were not

biased by her race and gender. At the same time, she had strong feelings of "equity and justice" that she tried to hide "because I know it makes others uncomfortable." She commented on how she was treated by her classmates: "After my picture was revealed, there was a subtle difference," she wrote. At the end of the ES© participant 2 still wished the others could know about her experience and influence outside of the chat rooms so they would give her opinion more weight.

All in all, she saw her own influence in the real world as being connected to her position and experiences, but also acknowledged that race and gender play a role. There appeared to be no change in her conception of identity throughout the sessions.

Influence. (27 instances) At the start of the chat sessions, participant 2 described her influence in her work setting as based upon her "experience, responsibilities, and beliefs," and was surprised when her "excellent suggestions" during session one are not accepted. She noted that comments made by some people were followed, while others' "similar or identical" comments were ignored.

She recognized that the most influential participants were 1 and 6. Participant 1 influenced by being "directive," "antagonistic," "negative," and "cynical," and 6 influenced by being "commanding." Participant 2 attributed her own lack of influence on the use of "vague terms that are not as directive," and attributed others' lack of influence to them not being "responsive." She also attempted to gain influence by being "obstinate" when it was time to sign off.

As she planned for the second chat session, participant 2 decided to increase her influence. She wrote, "I will not become stubborn, and I will be more forceful in my writing to gain more respect and attention for my ideas."

She noted that her influence on the group increased from session one to session two, even though "many of the suggestions I made the first session, I repeated, and they were accepted." She attributed this change to her communication style. She wrote,

> I believed that during this process I could be a little more candid. I realized that in order to get the tasks done, we all have to make some concessions. I decided to go with the flow and not push people on the issues.

In set five of the Power and Identity questions, participant 2 described how she began to question her assumptions about her influence. She realized that the power of her office influences how people respond to her, and that those lower on her staff "respond even more positively to my ideas." She began "asking people to give me feedback on how I sway decisions."

When she found out that she was represented to her classmates as a white woman after session one, she acknowledged that this false identity may have been the reason the class treated her differently in session two. She reflected,

> I do know that people reacted differently to me during the second session and now I am not sure if it was a result of my picture or a change of heart. People gave me direct feedback about my contributions as well as integrated my ideas in the task force work.

She believed her influence may again have been affected after they learned her true identity, a black woman. She wrote, "I believe that people may have responded to me differently now that they know I am a person of color and a female. People are often times overly concerned with being inclusive, for fear of not being inclusive." She

desires her influence to be based upon her “experiences and knowledge” rather than her position or personality.

As a result of her experiences in the chat sessions, participant 2 noted changes in her use of influence in her work environment. She reported “talking less and listening more” so that decisions were “dictated by the situation and not by my role.”

Leadership. (27 instances) Participant 2 described two kinds of leadership. One style was directive and commanding, typified by 1 (directive) and 6 (commanding). A second style was more inclusive. She saw effective leadership as twofold: (1) leaders create an organized system to provide focus and accomplish a task, and (2) leaders include stakeholders equitably.

Participant 2 put heavy emphasis on equity and inclusion in leadership. She used words and phrases like “inclusion,” “consensus,” “gaining input from everyone,” “agreeing,” “concessions,” and “equity.” For her, a leader needs “experience working with a diverse staff and clientele.”

Participant 2’s conception of her leadership changed slightly over the chat sessions and interviews. She began the ES© viewing leadership as making sure everyone’s voice is heard, and then considering those contributions when making a decision. After the first two chat sessions, she described her role as a leader—to “intentionally ask others for their input even though they are not responding.” However, she saw her use of leadership as situational, being sometimes “inclusive,” and other times making “tough decisions.” She stated that she “consider(s) the ideas of others,” but that others accuse her of “already knowing what I want.” Since she did not actually share the decision-making power, she only gave the impression of inclusion.

After she saw the pseudo image of a white female that represented her, she shared how she had been changing in her work environment. She stopped talking so much during decision-making tasks and started listening. She asked her coworkers for feedback on "how I sway decisions." She began to realize that her enactments of leadership did not really honor others' voices.

In her last interview, participant 2 still described leadership as providing focus and inclusion. However, inclusion took on a new meaning for her. She said she was "more conscious of how I interact with people, especially when making decisions about the work we do for students. Some feedback I've gotten from staff is to not ask for input if I already know what I want." Instead she desired to acknowledge and "recognize the contributions of others." She seemed to move from defining equitable leadership as *giving everyone a voice* to enabling the "decision making power of the group."

Openness—willingness to change. (13 instances) Participant 2 wrote comments throughout the reflections that displayed openness to the online process and a willingness to consider change. In her practice posts before the first set of reflection questions, she stated her excitement for the upcoming experience. Her first answer in her first reflection stated, "Initially, I was excited about the design of the course." That openness continued after she found out a pseudo photo had represented her all along, and she discussed how she began implementing changes in her leadership style in the workplace (see above). She closed set five of the Power and Identity reflections by saying, "This is a really interesting project. I can't wait to see how it comes together."

Participant 2 made 13 statements that displayed willingness to change. Some such statements follow:

- "I will also look at ways I responded to others in order to check my interaction."
- "I realized that in order to get the tasks done, we all have to make some concessions. I decided to go with the flow and not push people on the issues."
- "As I consider the topic of the course and the way the class is going, I will strongly consider how I want to present myself."

Power. (25 instances) Participant 2 underwent a change in her use of power. Through the ES© process, she recognized that her approach to inclusion disempowers others, and she moved to an inclusive approach that empowers people for decision making. Brunner (2002) describes this as an ontological shift from an inclusion approach that is consistent with a power over foundation to an inclusion approach that is rooted in power with/to (p. 703).

At the beginning, participant 2 actually described herself as holding a "mixed" (Brunner, 2002) conception of power, applying it as the situation dictates. She explained,

> My leadership style can be considered situational. I can be inclusive when I need to be, however, I can also make those tough decisions that no one wants to make. I consider the ideas of others. Yet, I have been accused of already knowing what I want. I am not sure what others think of me. I believe that people will think that I can be stubborn and keep at it until I get what I want.

Several things seem to have led participant 2 to change. Participant 2 described how in the first session, "1 and 6 were directive in responding during the chat room. 6 was commanding." Due to their behavior, her contributions in session one were ignored, and she was left feeling powerless. She wrote,

> At the end of the session, I decided to use some power and not respond to the group when inquiring about signing off. And I refused to exit the system until 6 and others had done so. Individuals who feel powerless will find ways to gain power.

Through her reflections online and at work, participant 2 began to understand that her power over approach to inclusion was flawed. “It is difficult to make a decision with all the details and feedback from stakeholders.” She later added, “I realized that in order to get the tasks done, we all have to make some concessions.” She observed the online group making concessions and working together, and wrote,

> This group began to work together… everyone realized that we are dependent upon each other to do this work. People acknowledged others input and suspended judgment. A system was created to give people a voice and to work in small groups.

Participant 2 related her observation of groups in her workplace that “work well independently, yet, struggle collectively. What I’ve noticed is the competitiveness, lack of communication, accountability, and ownership in this group when we are together.”

Participant 2 reflected on her own role as a leader and began to change her actions to provide more group ownership. The course readings assisted her in coming to these new understandings.

> As I worked with a task force on my job this week, I used some of the insights I learned from the chat room work. It was interesting how people respond to what I say, and the impact of what I say has on group work. I found myself talking less and listening more as well as asking people to give me feedback on how I

sway decisions. The articles we read last week about giving orders and power really stuck with me. I heard myself saying to the group, the decisions that we make about the work that needs to be done should be dictated by the situation and not by my role.

Evidence of participant 2's ontological shift from power over to power with/to was found in her changed answers to a question regarding the most important thing to consider in decision making. Her answers revealed that she went from defining shared power as *a leader gathering input from stakeholders to make a decision*, to defining shared power as *a leader providing a framework for shared decision making by the stakeholders*. Before her experience in ES©, she stated, "The most important things to consider in any decision making process are understanding the issues and including stakeholders." After the final chat session, she responded to the same question by saying, "The most important thing in a decision making process is to understand how the group is going to make the decision; as well as the decision making power of the group."

Reflection. (30 instances) Participant 2 made at least 30 comments that demonstrated a degree of reflection. Her reflective comments can be categorized as (1) openness to the ES© process as a learning experience, (2) self-reflection/criticism and how she might improve, and (3) hypotheses explaining ES© phenomena due to dynamics of the process and of human nature.

(1) Participant 2 described her interest in and fascination with the ES© process and reflected on what she learned through it:

- She noted how the anonymous nature caused some to be ignored while others gained attention.
- She wanted to learn more about the process of masked identities in the course.
- She expressed an eagerness to see how group dynamics “play out.”
- She considered how the addition of pictures affected the group.
- She projected future interactions once they meet face-to-face.
- She marveled at the diversity of people in the course.
- She was intrigued with who was chosen to represent her and why.
- She noted how interaction changed in the chat space once they knew who each other really was.

(2) Participant 2 self-reflected, criticizing her actions and often considering alternative actions to improve her behavior or effectiveness.

- She recognized her refusal to sign off as an attempt to exert power and criticized her own stubbornness.
- She considered that the reason for her lack of influence may be her use of vague and indirect comments and so planned to use a more forceful expression of ideas to gain “respect and attention.”
- She vowed to look back at the transcripts to assess her interactions with others.
- She decided to be more candid and honest in the chat space, but also be willing to make concessions.

- She decided to stop judging people's motives for their comments and actions.
- She considered whether her casual self-presentation in the video may have contributed to her lack of influence.
- She commented on how she has applied what she learned about leadership through the course to her work situation.

(3) Participant 2 frequently hypothesized about the factors influencing group and personality dynamics.

- She hypothesized that participants were more blunt with comments because of the anonymity.
- She wondered whether the videos would sound as optimistic now that they have interacted in the chat space.
- She wondered whether her picture was what caused the change in people's response to her.
- She reasoned that people began picking on each other in the third session because they had finished their task early.

Resistance. (2 instances) Participant 2 rarely displayed anything that might be seen as resistance to change or to the ES© experience. Only two small occurrences were noted. She did not speculate on how people might react differently after seeing her photo, and she stated that hearing people's voices would have no impact on how they work together.

Participant 2 summary. Participant 2 underwent cognitive change in both her conception of leadership and use of power. Originally, participant 2 wrote that the role

of a leader was to be inclusive and provide focus to accomplish a task. She envisioned herself as that type of leader. At the early stages, she believed an inclusive leader allows everyone to have a voice when feasible, but the leader ultimately makes the decision. She wrote,

> My leadership style can be considered situational. I can be inclusive when I need to be, however, I can also make those tough decisions that no one wants to make. I consider the ideas of others, yet I have been accused of already knowing what I want.

Through the ES© process, she recognized that her approach to inclusion disempowers others, and she moved to an inclusive approach that empowers people for decision making. Brunner (2002) described this as an ontological shift from an inclusion approach that is consistent with a power over foundation to an inclusion approach that is rooted in power with/to (p. 703). In terms of leadership, participant 2 moved from defining equitable leadership as giving everyone a voice to defining it as enabling the "decision making power of the group."

How does this change come about? Participant 2 found herself in a situation where others (6 and 1) took the leadership roles and gave preference to some voices while ignoring others. Hers was a voice that was ignored, even though she provided some of the same suggestions as others. She observed,

> During the work session, I offered several suggestions for the group to consider; interim director, and group norms. I thought these were excellent suggestions that were not given credence until mentioned by others. I sat back for a while

> and read responses from others wondering if my absence would be noticed; it wasn't.

Participant 2 resented that participant 6 acted as a facilitator who took others' ideas and restated them. Although 2 had used that strategy as a leader herself in the past, she found it frustrating as a follower. Later she reflected, "Repeating something as if it was your idea is frustrating and devaluing." She resented 6's leadership. She complained, "6 is either a white male or an assertive white female. 6 is used to getting his/her way and with being listened to." Participant 2 found herself acting in negative ways as a result. She described,

> At the end of the session, I decided to use some power and not respond to the group when inquiring about signing off. And I refused to exit the system until 6 and others had done so. Individuals who feel powerless will find ways to gain power.

As a result of her experiences, 2 began to change her view of leadership and the way she led in the work place. She reflected, "I've learned that inclusion is really important. Did I know that already? Sure! However, sometimes we need reminding." She relayed how readings and experiences in the course have led her to employ new leadership styles in the workplace. Participant 2 explained,

> The article on power in the decision making process was really powerful for me. I am more conscious of how I interact with people, especially when we are making decisions about the work that we do for students. Some feedback I've gotten from staff is to not ask for input if I already know what I want.

Not only did 2 describe new behaviors consistent with a power with/to foundation, she revealed an ontological shift from power over to power with/to. This change can be clearly seen through her answers to the same question posed at the beginning of the ES© and at the end. The question asked the participants to respond to what they believed to be the most important thing to consider in the decision making process. Participant 2's answers revealed that she went from defining shared power as a leader making a decision after gathering input from stakeholders, to defining it as a leader providing a framework for shared decision making by the stakeholders. Before her experience in ES©, she answered the question in this way: "The most important things to consider in any decision making process is understanding the issues and including stakeholders." After the final chat session, she responded to the same question by saying, "The most important thing in a decision making process is to understand how the group is going to make the decision; as well as the decision making power of the group."

Certain notable characteristics of participant 2 may have contributed to her ability to change. Participant 2 was very reflective, providing 30 examples of reflection. She also expressed openness to learning (27). She had a strong sense of self-efficacy (14), and she regularly applied background knowledge from her work environment to the chat experience (14). In contrast, she showed little resistance (2), but instead expressed excitement over the learning environment (7).

Observations about Participant 3

Anomaly. (7 instances) Participant 3 admits to being surprised at several points during the ES© experience:

- He was surprised by discussion at the end of the first session that more efforts should be made to include everyone in the task.
- He was surprised during the first session when his suggestions were ignored.
- He was surprised by how diverse that class was when he saw the pseudo photos because it did not fit his experience in Minnesota educational leadership positions or the racial diversity in his university classes.
- He was surprised when he learned that he had been represented to his classmates as an African-American man when he is white.

Attitude – emotions. (21 instances) Participant 3 did not express any strong emotions. He had some slightly negative emotional statements after the first session, but by the end his comments were mostly positive—or showing **excitement** (6).

Annoyance. (2 instances) Participant 3 commented on his annoyance with a classmate, who from the description, was probably participant 1.

Frustration. (7 instances) Participant 3 experienced frustration in the chat room environment. His frustration came from trying to comprehend a disjointed discussion while trying to key in thoughts and contribute in meaningful ways. “It seemed like a flurry of input that really didn’t seem to go anywhere.”

He was also somewhat frustrated that the anonymity prevented him from getting his points across to the group. “I feel limited because I can’t put forth what I consider to be some of my strengths and assets because you can’t channel them through the internet!”

Confidence. (5 instances) After the second chat session, participant 3 began to express confidence in the group’s ability to accomplish the task. This confidence

continued to the end of the ES© experience: "I think we can work with each other and make sure that we are productive."

Blame. (1 instance) Participant 3 blamed the instructor for some of the group's difficulties because he felt the instructor did not provide clear goals and objectives to guide the group work.

Joy-excitement. (6 instances) Participant 3's expressions of excitement or enthusiasm occurred mostly at the end of the experience, although he was excited about the diversity that he thought existed after seeing the pseudo photos. At the end, he was excited that the group was able to be productive, and he was looking forward to working with the group in a face-to-face format. He also expressed appreciation for the instructor's planning so the students could have the ES© experience.

Background Knowledge. (16 instances) Participant 3 made frequent references to his experiences outside of the chat room because they helped him to negotiate the online environment. He saw parallels to his job as a principal, stating,

> In some ways the chat room sort of reminded me of my job. As a principal the conveyor belt of inputs never stops. It is sort of like trying to keep up with all of the inputs that are appearing on the screen while trying to think about what your own next input should be.

He describes using his work skills to listen to the input, assimilate it, and offer inputs to move the group along.

Participant 3 used what he knows about people to do the following:

- Filter people's comments to decide what is important and what is a distraction.

- Decide whether a person will follow through, or is full of hot air.
- Place a value on advice based upon the person's background.
- Decide whether to assign someone a task.

Participant 3 described how he used his past experience creating a district-wide technology plan to realize what could be realistically accomplished given the information provided in the problem-solving task.

Participant 3 used his past readings on identity (refers to Tallierco) to interpret problems of identity, such as those related to his white shirt, tie, and being a white male. He used the same background knowledge to help him make sense of his being represented by a pseudo picture of an African American male.

Participant 3 referred to his use of body language in the work setting to help him adjust his personal interactions and realized that he was handicapped without it in the chat space.

Change evidence. (5 instances) Participant 3 mentioned new understandings that resulted from his participation in ES©. Perhaps the most significant was what he calls "openness." He mentioned in three separate posts how he learned the importance of refraining from judgment of someone's value or input, and instead to give each person, especially those who may be from "an underrepresented group," an equal opportunity to be known. This was a shift away from making judgments based upon appearance or education when deciding to whom he should listen and instead giving value to each person's contribution.

Similarly, he changed his conception of how to make decisions. Originally he emphasized decision-making in an authoritarian manner, stating he "overemphasized

'knowledge of facts.'" As a result of ES© participant 3 recognized the importance of leadership and organization to ensure the "exchange of ideas and dialogue between the key players."

The changes in his conception of leadership and decision-making can be summed up as moving from an authoritarian, command view of leadership, to one that is more democratic, based upon participation and inclusion.

Cognitive conflict. (2 instances) Participant 3 twice described the same incident that caused him conflict: He offered suggestions and no one responded. This concerned him because people normally responded to him due to the "positions I have held and the opportunities I have had to speak to captive audiences." He felt he had good input, but no one was listening.

Disorientation – loss of sensemaking. (6 instances) Participant 3 described the difficulty of navigating the chat space as "fifteen people trying to blow wind into the sail, the only problem was the wind was blowing from every direction." He complained that without the ability to see and read body language, he could not exert a greater presence. As a result, he felt the group was not making any progress.

In a separate theme, he described a sense of disorientation when the real photos of his classmates were revealed. "When it changed it was a strange feeling. It was a feeling almost of having to get reacquainted."

Efficacy. (19 instances) Participant 3 communicated only positive efficacy, describing his contributions to the group as positive and effective: "I think I did have influence in the way the conversations evolved because of my process suggestions." He referred to himself in positive tones, such as being a "good listener," being "pretty good

at developing relationships," and striving to help others "to feel status and importance." He expressed confidence in his ability to win support through his "skills in communication, listening, and offering expertise applicable to the situation."

Even though he found the chat space confusing, participant 3 noted his confidence that it would get better; that if he worked harder and prepared himself better, future chats would result in productive work. He expressed, "I am energized when a challenge or a task is dangling in front of me." He attributes the success of his suggestions to his hard work. "I have worked hard to read the input of my classmates closely and to really try to internalize as much as one can given the circumstances of the chat room."

Participant 3 believed that others considered his input as "tangible 'to do' items that can be implemented," and that they saw him as "reflective, concise, and directional." He referred to his positive impacts on the group and mentioned specific suggestions of his which the group followed. He stated, "I think this is something that happens to me on a regular basis."

Identity. (38 instances) Participant 3's understanding of identity changed. At the start, he freely commented on his perceptions of people based upon their image, gender, mannerisms, education, and experience. He explained how he uses identity to decide whether to pay attention to someone. "One thing that I think I do is to size up a comment made by someone and then put it in context based on their education and experiences." He wished participants could reveal qualities of themselves so they could decide who to follow. He wrote,

The group may be more inclined to listen to his/her words (director of curriculum and instruction) than a graduate student who is 24 years old and has taught in a classroom for four years and is now working toward their superintendent licensure with no applicable administrative experiences.

He thought about the importance people place on identity for assigning influence. He wrote about how graduate students are eager to share their experiences and jobs outside of work. When his comments were ignored in session one, he noted how in the real world people pay attention to him because he is the principal. He talked about how he pictured people differently than their initial, pseudo images based on their chat room contributions. He felt a need to apologize for his own white-shirt, tie, white-male appearance and the stereotype perception he believed it generated. Early on, he described hearing the participants' voices, when he read their text, as he imagined them based on the photo. He later realized later that he was "drawn toward those who inputted text that was solution focused and that offered productively to the process of organizing our material," and he stopped thinking about gender and race.

Participant 3 then began to express dissatisfaction with perceptions of worth based on identity. He wondered whether fellow participants' reactions to him were influenced by his portrayal as an African American male. He complained of "countless experiences where parents, staff, and students have preconceived notions about me as a result of my position."

Participant 3 began to speak of a new "openness" that would cause him to "reach out more to others with an opinion that might be of an underrepresented group." He also wanted to take class time to discuss the topic of perceptions in the face-to-face

class. He desired his classmates to know him for who he is, not for the photo that represented him, and he wanted them to know about his family and interests.

Influence. (41 instances) Participant 3 identified only four of the 15 participants—himself included—as being influential: ”I would say that 1, 4, 6, and 3 provided about 60% of the inputs while comprising only 27-28% of the participants. Maybe that is a hint at leadership.”

He was initially unsatisfied with his degree of influence. “I didn’t really feel that the group adopted my inputs globally, so I guess I would have to say that I wasn’t that influential or directive.” In the second chat session, however, participant 3 reported that his influence increased and that he was satisfied with it. “I felt as though my two suggestions were helpful to the larger group and allowed us to be more efficient.”

Participant 3 spoke very highly of participants 6 and 4’s influence. He stated,

> I think 6 and 4 are the most influential. I would consider 6 to be the “facilitator” profile person and 4 to be the “cheerleader” profile person. In going through the transcripts I noted that 4 often times would be sharing words of encouragement toward others as they offered input. 6 did a nice job of leading the group through a process that provided direction and helped us move forward.

In contrast, participant 3 was highly critical of participant 1’s influence. He made seven references to 1’s negative influence using words like “cynical,” “sarcastic,” “condescending” and “inappropriate.” He felt 1 wanted to “take the train off the track rather than to steer the train to its destination,” and was glad when someone stood up to 1. Despite this negativity, participant 3 acknowledged 1’s influence did “get the group to move forward.”

Leadership. (22 instances) Participant 3's conception of leadership underwent a slight change. Early on, participant 3 defined leadership as *seeking to make impressions so that others will line up behind you*. Participant 3's main qualifications for leaders were that the person knows what he or she is doing and is efficient. He described a leader as one who gathers facts with the help of stakeholders and makes a decision based on those facts so that a decision can be justified. He described the four participants (6, 4, 1, and 3) as being leaders because they provided 60% of the inputs. He expressed surprise that his classmates complained of not being included in the discussion because he believed everyone had the same chance to key in text. "I think if people weren't offering inputs that is their problem not the group's." He appeared to see the leader as doing the work on his own or with the help of a few, trusted others, with followers getting behind and supporting the leader.

Participant 3's leadership concept changed. In the end he described decision-making as a process that requires leadership and organization. He defined leadership as *providing an organized process for the group to come to a consensus that they can all support*. A good leader is one who ensures everyone's voice is heard. He spoke of the importance of "group participation." He wrote, "If a leader goes through the group process there is a greater assuredness that others will be in support of new initiatives, etc."

Participant 3 laid down certain markers along the way that helped him change his thoughts on leadership. He began to recognize the value of everyone's input. He notes that in the chat room he was "drawn toward those who inputted text that was solution focused and that offered productivity to the process of organizing our

material." Participant 6's leadership seems to be a model for him. He wrote of 6's "organizational ability":

> He tended to be able to consolidate information and present it in a way that had some direction. Additionally, he helped us with the process part of the exercises in that he was able to bring some organization to the madness.

Participant 3 described his frustration with the decision-making process the class used. Although, he originally wrote how subgroup "point people" should take the lead in "consolidating the information into the desired final product," he was critical of the process after he experienced it as one who was not a point person:

> I think it would have been nice to assemble the final product as a group. It seems as though the final product will be determined somewhat based on three people, one from each subgroup, and I am not sure that is the right way to do it.

He now realized that "a variety of inputs from stakeholders is important as one attempts to arrive at a decision that can be acceptable to all or most."

Openness—willingness to change. (35 instances) Participant 3 consistently used expressions that demonstrated openness to new ideas and willingness to self-reflect and change.

Openness to the ES© process. He was open to the ES© process from start to finish. Early on he expressed his fascination with the technology and considered it a "real learning experience." He mentioned six different concepts or skills he learned through the process. In his last reflections he expressed his appreciation for all the planning that went into the experience.

Openness to the pseudo identities. When the photos were first introduced, participant 3 expressed surprise at the diversity of the group. Even though he doubted their validity, he was still pleased. He expressed an increased curiosity for his classmates after seeing their pseudo images. When he learned that he was falsely represented as an African American male, he expressed a willingness to consider that it may have altered the way others treated him. He recognized the equalizing effect that the pseudo identities may have had, humbling some and providing "heightened prominence" for others. He even considered how his role in the group might have changed had he been represented as a woman.

Willingness to change. On several occasions participant 3 expressed an attitude of self-questioning and willingness to adopt new behaviors. He readily admitted that his "perceptions aren't even accurate." He spoke freely about things he was learning. He called on the others to "think back on this class" and to

> . . . agree not to feed into stereotyping and to give every new person we meet an opportunity to reveal themselves over time so as not to stereotypically 'count them in or count them out' before we have ample reason to do either.

Participant 3 said he was now less likely to insist on his own way in a group process, and would be "a little quicker to go with the flow." He intends to "apply my learnings in real life by being more patient and allowing more time to get to know people before I decide who they are."

Power. (54 instances) Participant 3 wrote often about power. Most of his discussion was coded as power with-to others (47). He clearly understood the philosophies and terminology associated with shared power, describing the importance

of being a “responsive listener.” He talked about “winning the support and trust of many different people” through his “skills in communication, listening, and offering expertise applicable to the situation in a way that helps win this support.”

While Participant 3 clearly understood the *language* of power with/to, he gave evidence that his underlying conception of power was power over (Brunner C. C., 2002). He described decision-making as something that one person does based upon “inputs from all or many of the stakeholders,” rather than as a shared responsibility. Participant 3’s reason for inviting input was that it

> . . . allows decision makers the opportunity to assemble a game plan that can be backed by a solid rationale. Having a good rationale is what saves decision makers when the decision may not work out like was hoped.

Through participant 3’s involvement in ES©, he noted how gratifying it was when his inputs were recognized and how disempowering it was when they were not. He explained,

> It was nice when someone would say, “Good thought Participant 3.” First, it confirmed that people were actually listening/reading, and second, it made me feel as though I had made a productive contribution to the larger group. It felt strange when I made a suggestion and there was no response.

Participant 3 began to expand his definition of power. Just before session three he wrote about “decision-makers” as being plural, rather than singular, and stressed the importance of getting “inputs from all or many of the stakeholders” rather than only from those who seemed qualified. While he spoke of collective decision-making, it was

only in terms of a power shared with a few: “The exchange of ideas and dialogue between key players is crucial to decision making.”

Following the third session participant 3 changed further, expressing personal dissatisfaction with the “key player” approach to decision making. He reflected,

> I think it would have been nice to assemble the final product as a group. It seems as though the final product will be determined somewhat based on three people, one from each subgroup, and I am not sure that is the right way to do it.

His language regarding decision making changed, noting the importance of sharing power with everyone. He commented, “A variety of inputs from the stakeholders is important as one attempts to arrive at a decision that can be acceptable to all or most.” He went on to say, “I think we can work with each other and make sure that we are productive,” and added, “I like group participation.”

Clearly, participant 3 was moving away from power over, which he viewed as gaining influence by using stakeholder input to manipulate buy-in, to power with/to, which he viewed as enacting shared decision-making.

Reflection. (61 instances) The most amazing thing about participant 3’s answers is the number of times he reflected upon either the ES© process or his own thoughts. He used the words “think” and “thought” at least 54 times. He frequently recorded metacognitive processes. For example, he observed, “One thing I think I do is to size up a comment made by someone and then put it in context based on their education and experiences.” He thought about the impact that the chat room process had on group interactions and his own work: “For the most part, the text input and reading allowed parties to remain somewhat generic.” He used comparisons and metaphors to reflect. “It

was a flurry of inputs with fifteen people trying to blow wind into the sail, the only problem was that the wind was blowing from every direction!"

Resistance. (4 instances) Participant 3's comments gave few indications of resistance. Those that did suggest resistance were related to the photos and whether they changed his interaction with his classmates, either before or after he knew they were false. Regarding his own pseudo photo, he tended to attribute the success or failure of his contributions in terms of his own abilities rather than the identity that represented him. This is consistent with his high degree of self-efficacy. "I don't think the masked identities had a great deal to do with how I interacted with my classmates."

Participant 3 summary. Participant 3 changed in several ways over the course of the ES© experience. He changed his conception of leadership, his use of power, and his assumptions about people based on their identities. Originally, participant 3 described a leader as someone who gains influence by being noticed, so that others will follow. He believed that the role of the leader was to figure out which voices to listen to, consider their input, and then make a decision. Through his experience in the course, he developed a new view of leadership. He now envisioned a leader as one who creates an organized process to make sure that everyone can participate in a *group decision-making process*. He concluded, "If a leader goes through the group process there is a greater assuredness that others will be in support of new initiatives, etc."

In terms of power, participant 3 entered the experience believing that shared power in decision-making means that one person makes a decision based upon "inputs from all or many of the stakeholders." Although he used the language of power with/to, he was actually acting with power over (Brunner, 2002). Brunner (2002) describes this

as holding a “foundational conception” of power over, on which a power with/to conception is extended (p. 703). Participant 3 noted two experiences that transformed his understanding of power. First, he experienced dissatisfaction with his inability to be heard. Second, he found it unsatisfactory to have a few people make decisions on the group work to which everyone contributed. He concluded, “A variety of inputs from the stakeholders is important as one attempts to arrive at a decision that can be acceptable to all or most.”

Participant 3 also changed his thinking about the role that identity should play in gaining a voice. He originally described how, as a leader, he listened to people based upon their education and experience. He wrote, “One thing that I think I do is to size up a comment made by someone and then put it in context based on their education and experiences.” Through the process of negotiating the chat space without the advantage of identity and by his false representation as an African American man, participant 3 realized that making pre-judgments on the worth of a person’s contributions based upon identity is unfair. He wrote about a new “openness” that will cause him to “reach out more to others with an opinion that might be of an underrepresented group.” On the basis of his experiences in the course, he intends to “apply my learnings in real life by being more patient and allowing more time to get to know people before I decide who they are.”

Participants 3 and 6 shared some similarities. Both were white men in leadership positions who were in a masked, online, problem-solving environment. Both men quickly realized that the pseudo photos were unlikely to be real because of the diversity they represented. Both also began with a strong self-efficacy, and were frustrated by the

behavior of participant1. However, despite these similarities, 3 learned and changed while 6 did not.

Unlike 6, participant 3 expressed openness to the pseudo photos and the ES© process. He talked about the class with excitement. He also described a desire to learn from his experience. Participant 3 was very reflective, and wrote several times about the background knowledge he applied to the ES© setting.

Observations about Participant 4

Anomaly. (2 instances) Although participant 4 did not record anything that could be considered a true anomaly, she expressed surprise at the videos because she believed them to be scripted. Participant 4 was also surprised that she did not know more of the class members, and indicated that 5 and 6 did not look much like what she pictured.

Attitude—emotions. (30 instances) Participant 4 displayed several instances of **frustration** (11) early on, but showed more confidence (10) as the session wore on.

Anger. (0 instances)

Annoyance. (3 instances) Participant 4 expressed a few moments of annoyance over the behavior of her classmates, referring to the rude comments of others and to the fact that some classmates seemed unprepared. Participant 4 specifically mentioned being annoyed with 6 because he seemed “biased in his facilitation,” acknowledging some input and not others.

Blaming. (6 instances) Although subtle, participant 4 had a tendency to lay blame elsewher when things did not go the way she would have liked, or her behavior was poor. She blamed the structure of the chat room, a bad mood, stress, and the

performance of the group. In some cases it was more an excuse than actual blame. For example, she implied that lack of success was the group's fault, stating, "The group didn't narrow down the issues."

Confidence. (10 instances) Participant 4*'s* confidence emerged after session two, but that confidence was based on the group's processing, cooperation, and ability to complete the assigned task. It was not until the end that participant 4 made a comment about her own confidence: "By the last session I felt self-confident enough to be myself with the group and brush off negative comments."

Frustration (11 instances). Participant 4 recorded most of her frustration early on, after session one. She was frustrated by the structure of the ES© environment because of the number of people in the chat room and the lack of identity. "I really disliked the first session . . . I felt trapped by the lack of identity. In fact, I hated the on-line experience so much that I dreaded returning for the second session."

Background Knowledge. (1 instance) Participant 4 made just one reference to her use of previous knowledge to solve problems in the ES© environment. She applied behaviors that she used to gain cooperation in her daily work setting to the chat room interaction. "The group reacted to me more positively when I was less assertive," she said. "That's usually the case. I'm received more favorably if I display collaborative, respectful, and less assertive behaviors."

Change evidence. (1 instance) Although participant 4 mentioned something she learned about communication in the chat room, she seemed to apply it only to her chat room experience and not to situations in the real world. When asked what she learned

about herself, she answered, “The attitude from the group is based upon my words rather than my identifying traits and nonverbal traits.”

Cognitive conflict. (3 instances) Participant 4 spoke of being stressed. She was also conflicted in that the assumptions she made about her classmates based upon their chat room behaviors did not match the pseudo images she saw.

Disorientation—loss of sense making. (2 instances) Participant 4 was confused by the pseudo photos because she expected to recognize some people and didn’t. She declared that the whole group seemed confused after the real photos were revealed. “I don’t think anyone knew what to say!!!!”

Efficacy. (4 instances) Participant 4 gave only slight insight into her efficacy. She felt ineffective in the first session and was critical of her antagonistic presence in the chat room. At one point she expressed doubt that anyone would say she was influential based upon her photo. She added, “In my opinion, I look ‘nice.’ In reality, I am not nice!!”

She indicated that she was confident in her ability to influence how people react to her, and resolved to change her approach in the second session to improve her influence. She felt her participation was honest, and she expressed a satisfaction with the way she sounded in the video.

Identity. (25 instances) Participant 4’s conception of identity seemed to remain constant throughout. It was her belief that “gender, age, ethnicity, profession, education, and experience” are the factors that “affect an individual’s approach to problem-solving, leadership style, and assumptions.” After seeing everyone’s pseudo photos, she still

wanted to know their education and professional experiences. She felt that participants may have treated her differently based upon her "bogus photo."

Participant 4 made contradictory statements regarding her personal identity. She described feeling "an incredible surge of freedom in knowing that I was virtually on a level plane with everyone else" due to her lack of identity. However, she also stated, "During session one, I felt trapped by the lack of identity." When asked what pseudo identity she would have chosen, she stated, "male, forties, suit, deep voice, Caucasian."

Participant 4 saw one's identity—as represented by gender, age, ethnicity, profession, education, and experience—as being closely connected to one's power. This conception did not change.

Influence. (19 instances) Participant 4 noted only a few participants who were influential: 9, 6, 5, 1, and herself. She felt that 9 and 6 diplayed negative influence because they wanted to further their own agendas as leaders, although 9 became less influential in session two. On the other hand, she found participant 5's influence to be favorable. "5 had knowledgeable input and kept the comments mainly in reference to the task."

She felt participant1 was influential, but she did not approve of 1's methods. "I'd like 1 to be kind to the other members of the task force and realize that her voice is not the only voice." She indicated that both she and 1 exerted negative influence.

During the first chat session participant 4 felt limited by her inability to communicate in the large group. She attempted to gain influence by being an "antagonist." She intentionally set out to be more focused and inclusive in the second session, and she stated that this strategy increased her influence. "I attempted to get the

session focused on the tasks. I was more agreeable during the second session than during the first." She added, "The participants were respectful, patient, and encouraging to me during session two."

Leadership. (17 instances) Participant 4's conception of leadership remained constant throughout. She described leadership as organizing a platform for inclusion of all participants, opportunities for sufficient dialogue, and decision-making by consensus. "Whatever they (leaders) may be, they must be inclusive of the learning community and the community at large." She was critical of other participants' attempts to take leadership control, and especially critical of 1's style, calling it, "authoritative," "domineering," and "lacking respect for participants."

Participant 4 described her own leadership style as, "collaborative (participatory), yet directive, assertive and innovative," adding, "My colleagues would probably describe my leadership style as assertive, resourceful, and task-oriented."

Openness – willingness to change. (0 instances) Participant 4 did not express any openness to change.

Power. (26 instances) Participant 4 did not give any indication of change in her understanding or use of power during the chat sessions and reflections. She noted with disapproval three group members who sought to exert "power over" saying they "pushed hard for a leader." She described 9, 6, and 1 as "controlling, bold, and straight-forward." She further portrayed 1 as, "authoritative," "domineering," and "lacking of respect for participants." About participant 6, she said, "6 irritated me because in my opinion he was too biased in his facilitation. Specifically, he would push for acceptance

of comments made that he agreed with, but didn't often acknowledge those he didn't agree with."

In contrast, participant 4 described her personal approach as power with/to. She discovered that when she attempted to exert power over, she was not well-received. "The group reacted to me more positively when I was less assertive," she said. "That's usually the case. I'm received more favorably if I display collaborative, respectful, and less assertive behaviors." As she prepared for session two, she stated, "I will attempt to be sensitive to the inclusion of all task force members."

Participant 4 described the most important aspects of decision-making as, "consensus on decisions, plenty of dialogue time, and an organized mode of deliberating so as to include all participants."

Reflection. (6 instances) Until the last sets of questions, participant 4 gave evidence of only superficial reflections about group processing and her own behavior. In her final responses, she revealed more inner thought by using strong words like "trapped," "hated," and "dreaded." Yet her summary of what she learned was unremarkable, revealing that her thinking about identity changed little. Her applications were mostly directed away from personal responsibility and toward other people. She seemed to know what the problem was, and it was others—not her. *They* should change. She explained,

> Through this experience I have realized that men and women alike have preconceived notions as to what the role of the superintendency should be. Most importantly, I believe that everyone has some stereotype of the superintendency. This is what needs to be changed.

Resistance. (11 instances) Participant 4 left some reflection questions blank and gave very short answers to others, as seen in the following example:

Question: If you could announce, right now, something you think is important to the entire class, what would it be?

Answer: Nothing really.

Despite her contention that identity played a role in people's interactions, she claimed that she was not affected by others' photos and that others were not affected by hers. After seeing the video clips, she decided they did not really represent class members and refused to engage in questions about identity, saying, "I really don't think my opinion is necessary when I believe the other responses in the group are scripted and mine was not."

In the end she contended that identities had nothing to do with the group interaction. "I don't believe my role changed once my identity was revealed. I think everyone treated me the same."

Participant 4 summary. Participant 4 did not seem to change in her conceptions of leadership, power, or identity. She did, however, change her approach to the chat environment from sessions one to session two. After being perceived as antagonistic in session one by most of the others in the group, participant 4 explained that she felt trapped by the chat environment and her lack of identity, and so attempted to gain influence by being an "antagonist." When she realized this did not help her, she decided to be "more agreeable during the second session than during the first." As a result, she found, "The participants were respectful, patient, and encouraging to me

during session two." Indeed, the other group members noticed this change and commented on it in their reflections.

Participant 4 was consistent throughout the ES© experience in describing her appreciation for and use of power with/to. She is critical of 9, 6, and 1 for trying to exert power over. Her own attempts to exert influence in session one left her unsatisfied. "The group reacted more positively to me when I was less assertive. That's usually the case. I'm received more favorably if I display collaborative, respectful, and less assertive behaviors." Throughout the experience, participant 4 described leadership as organizing a platform for the inclusion of all, with opportunities for sufficient dialogue and decision making by consensus.

Her conceptions of identity remained constant as well. She began by discussing the importance of "gender, age, ethnicity, profession, education, and experience" and continued this concept, even preferring her own pseudo image to be a white, middle-aged male.

When discussing lessons learned, participant 4 described new knowledge in terms of what others—or people in general—should learn rather than what she herself has learned. She concluded,

> Through this experience I have realized that men and women alike have preconceived notions as to what the role of the superintendency should be. Most importantly, I believe that everyone has some stereotype of the superintendency. This is what needs to be changed.

Participant 4's reflections did not give much insight into her thoughts. She was seldom reflective, expressed no openness or willingness to change, and described little

background information that she brought to bear on the ES©. In contrast, she indicated resistance to both the process and reflection, and preferred to shift blame to others or to the environment. Participant 4 gave few glimpses into her efficacy, but these were mostly positive.

Observations about Participant 5

Anomaly. (5 instances) Participant 5 was surprise by certain aspects of the ES© experience. She had expected more men in the class than the pseudo photos showed. She was surprised when she learned she had been represented as a man, and again when she figured out that everyone else's photo was false. Significantly, participant 5 surprised herself with her anger at 1's behavior. She was also surprised by 4's change in attitude from session one to session two.

Attitude – emotions. (34 instances) Participant 5 expressed a variety of emotions tending slightly toward the negative, as summarized below:.

Anger. (4 instances) Participant 5 directed her expressions of anger at participant 1's behavior. She described 1 as "rude," "sarcastic," impatient, and immature. She found 1's personality to be "distasteful," and declared, "I have taken an extreme dislike to her." Participant 5 also described being intimidated by 1 and afraid to meet her in person.

At first she was surprised by her reaction and attempted to resist her feelings of anger by imagining possible causes for 1's irritating behavior: "I made up reasons why she behaves that way. Knowledge would be one way to maybe dispel that dislike." Later, participant 5 gave in to her anger and expressed hope that the class would "come down collectively on student 1."

Participant 5 appeared to be bothered by her inability to prevent making negative judgments about 1, stating, “I have developed such an intense dislike for 1 so I cannot judge fairly whether her influence is positive or negative.”

Annoyance. (6 instances) After the first chat session, participant 5 expressed annoyance with rude comments made by 1 and 4. She noted that everyone except 1 and 4 was willing to concede some control for the sake of the group. She was also annoyed by references to beer in the first chat.

Blaming. (3 instances) Participant 5 laid on her instructor some of the blame for her own feelings of frustration with the process and anger with her classmates. She wrote to the instructor, “Why did you not intervene?”

Confidence. (12 instances) Participant 5 began to express after session two confidence due to three factors. First and foremost was confidence in the *group process*: “Once we were better able to focus on the tasks instead of how to get to the tasks in a chat room, we really started cooking.” She added, “I think the group participants worked very hard to include everyone in the process.”

A second factor in participant 5*’s* confidence was contentment with *her role* in the problem solving task. She credits being named the “chat room cop” in session two, and the fact that in her sub-group, she “actively and with confidence participated in generating ideas, listening to my group members, and learning.”

The third contributing factor was the unveiling of the pseudo photos. She expressed confidence that she would be “less frustrated and/or concerned” and that others would be “more relaxed” after realizing that their participation had been hampered by false identities.

Frustration. (7 instances) Participant 5 expressed frustration at the "chaotic" nature of the first chat session, and part of the third: "By the end of the evening I felt like a rat in a research laboratory and was wondering what any of this had to do with understanding the role of the superintendent in a school district." She found the chat room communication frustrating. "I must be communicating with an entire group of adolescent males," she declared. The anonymity also frustrated her. She commented, "I felt invisible last night and did not feel a connection to anyone in the group."

Joy-excitement. (2 instances) Participant 5 became excited once she learned the group's interaction had been manipulated using false identities: "I can only hope that during our first meeting we will talk about this all night! This is great!"

Background Knowledge. (2 instances) To help facilitate group discussion, participant 5 applied some of the communication techniques she had learned in other settings to the chat room. She also related from her experience how connections and relationships with people might improve their chat room work to be "more creative and meaningful."

Change evidence. (0 instances) Participant 5 made no statements to indicate that she changed in any way.

Cognitive conflict. (3 instances) Participant 5 was greatly troubled by the behavior of others in the course. She described an inner conflict between wanting to disengage from the course and wanting to be a part of a solution to the problem.

- "I am honestly considering dropping the course and taking it at a later date."
- "I was not satisfied with the role I played . . . I became more and more disturbed by the rude and sarcastic comments yet did nothing about it."

- “Part of me believes very strongly in finding ways to work with others even when there is great conflict. But a part of me feels like a doormat too.”
- “I will spend some time talking myself into taking a positive stance for Monday night.”

Disorientation—loss of sense making. (4 instances) Participant 5 felt disoriented in the first chat session due her lack of identity. She explained that in real-world groups she has “a reputation built on trust and respect,” but in the chat room she was invisible. “That feeling of being invisible, of not truly having a voice, was horrible,” she wrote.

Efficacy. (23 instances) Participant 5 expressed numerous thoughts that revealed her efficacy—most of them negative (17). She wrote about her lack of confidence, describing her inability to control situations or stand up for herself as “demons” she still has to fight. She also mentioned needing to talk herself into a positive frame of mind and having to “deal with one of my weaknesses.” Participant 5 repeatedly indicated that she feared the group sessions would continue to be poor, and that she would be powerless to change things. “I predict I won’t do anything much differently in session two as I did in session one.” She reflected that her picture and video portrayed an image of someone who was a “push over,” “stupid,” and “therefore harmless.” Her lack of respect for participant 1 seemed to increase her low self-efficacy as well.

She believed that for conditions to improve, others, or the group as a whole, needed to change things. In fact, she credited 4 with helping her to get involved in the group discussion and take a more active participant role. Her perception that she needed others’ help is skewed, however, as she was consistently among the six participants

with the highest number of posts in all three sessions. Her lack of respect for 1 seemed to be a source of low self-efficacy for her, also.

Participant 5 did make a few comments indicating a positive self-efficacy (6). Feelings of positive efficacy derived from her role as an “encourager” and respectful listener. She noted how the invitation to play the role of “chat room cop” and her equal opportunity for involvement in the small group helped her feel positive about her participation.

Identity. (24 instances) Participant 5’s conceptions of identity were very specific and relatively narrow. To her, the most important aspects of identity were age and gender. These concepts remained the same throughout the reflections.

- She repeatedly refers to her fellow participants as “adolescent males” after the first session because she thought the group was rude and referenced beer.
- She frequently spoke of the mental images she had of group members in terms of gender and age.
- She pictured those she did not care for (1 and 4) as young, immature, attractive, but both male and female.
- She pictured those who took positions of leadership as middle aged and male.
- After seeing pseudo photos, she referred to a fellow participant as preferring top-down management because he was portrayed an older man.
- She saw 4 as influential because she was represented by a photo of a woman in her late forties.

- After seeing that she (a female of color) was represented as an older white male, she described the image as a "Christian male and the kind that is used to privilege and power."
- She liked being portrayed as a man and wondered if being seen as an older, white male was the reason why she (a) gained more access to the group process and (b) lacked feelings of closeness with other group members.

Participant 5 identifies herself as being an "elder stateswoman" with a "warm, empathetic, enthusiastic, and expressive" nature.

Influence. (24 instances) Participant 5 referred negatively to 1's influence at least eight times. She described 1's negative influence as stemming from her sarcastic, directive, and authoritative manner: "1 is authoritative. She tells, doesn't usually ask. 1 is about content, not process."

Participant 5 found people positively influential if they were facilitative, encouraging, and inclusive. She credited 6, 3, and 4 (after session one) as being positive influences. Participant 4 invited her to play an important role in the group process during session two, and she felt that 6 did "an excellent job of delegating and assisting in moving the group along through the process."

Participant 5 did not see herself as influential at first, but acknowledged that her influence improved after she was invited to help facilitate the group chat in session two.

Leadership. (23 instances) Participant 5 depicted leadership as encouraging group members and facilitating group processing and inclusive decision making so everyone's voice is heard. She praised 6 for displaying many of those leadership qualities. She believes in collaboration: "I like working collaboratively and truly believe

that the whole is bigger than its separate parts." She also believes in shared leadership, reflecting, "I would like it if we rotated group facilitators because, in my mind, that is a more collaborative way of working together." In contrast, she criticized 1's leadership as "directive" and authoritarian:

> 1's comments were directive in that they did not generally ask for responses nor suggest a listening posture. The comments centered around telling the group to stick to the assignment with very little tolerance for a different direction another group member might want to take or was pursuing.

Participant 5 pictured herself as a collaborative and encouraging leader, stating, "My style is to attempt to find ways for group members to work together successfully and to develop strategies that honor everyone's voice."

Openness—willingness to change. (14 instances) Participant 5 made numerous statements that revealed a willingness to consider other perspectives or ways of doing things. Participant 5's openness was evident by her change of attitude in the ES© process. After the first session, she was frustrated and wanted to quit, but as she experienced the process, including the pseudo identities, she became more and more open to it. In her last reflections, she stated, "I can only hope that during our first meeting we will talk about this (ES©) all night! This is great!" Participant 5 was also willing to change her behavior and her judgments about others.

Power. (40 instances) Participant 5 displayed a very clear understanding of the differences between power over and power with/to (Brunner C. C., 2002)—although she does not use those terms. She reflected on those differences in the group dynamics, saying, "From that point on, the group started to divide into separate camps depending

on whether or not they wanted a designated leader or facilitator, or wanted 'collaborative leadership.'"

She held a *mixed* view of power (Brunner, 2002), perceiving the type of power to use as situational. She explained,

> I believe one of the most important factors in any decision making process is collecting information. Sometimes there is a lot of time to do this and a more consensus building model of data collection can be used. Other times, a decision needs to be made in a very short period of time so less stakeholders can be consulted. And sometimes, there is a self-imposed schedule for the process that does not allow for good decisions because of lack of good information.

Participant 5 associated power over with men. She identified participant 11 as being most directive based upon the pseudo photo, stating, "Going by looks only and the stereotype generally associated with the looks of an older gentleman, 11 looks like a top-down management type." After seeing the pseudo photos for the first time, she commented, "It will be interesting to see if the male members of the group begin to take charge." Participant 5 is critical of 1's authoritative approach and is surprised that her pseudo photo is a woman: "Before I saw the class photos, I thought 1 was the most directive of the group." She adds, "My theory is that gender will have the most effect on how we communicate with each other next Monday."

Participant 5 does not like overt power over behavior, such as the kind that 1 displayed. She wrote, "Student 1 is, in my opinion, an example of negative power and/or influence. I believe that her sarcasm, impatience and immaturity greatly hampered the group's work."

She recognized 6's use of power over, stating, "Due to 6's persistence, s/he gradually and completely takes the helm." However, she accepted and appreciated it because "6 continues to make sure that all voices are heard and are in agreement both to 1's plan and to signing off." Later she added, "6 does an excellent job of delegating and assisting in moving the group along through the process." Though participant 5 described participant 6's leadership in terms of power with /to, she noted that 6 is actually using power over. She reasoned,

> 6 has a consulting leadership style. She is very careful about including everyone's point of view and acknowledging dissension, but after consulting with the group, she decides on what seems to be the best idea and can influence the group to agree with her.

Participant 5 preferred a power with/to approach. "I would like it if we rotated group facilitators about every half hour or so, because, in my mind, that is a more collaborative way of working together." She added, "I want others to know that I work very well in a collaborative environment." She saw herself as using power with/to. "My style is to attempt to find ways for group members to work together successfully and to develop strategies that honor everyone's voice."

Despite the negative influences from some group members, participant 5 felt the group completed their work in a collaborative manner. She stated,

> I think the group participants worked very hard to include everyone in the process. When I look back over the transcripts, I see that all group members have had an opportunity to share their ideas and contribute to the final product.

Reflection. (44 instances) Participant 5 was extremely reflective. By sheer number, this was her most prominent characteristic. Her reflections centered mainly around five areas: Fifteen were *self-reflections* in which participant 5 considered her own thoughts, motives, and actions. Eleven comments speculated on the *ES*© *process* itself, while another nine focused on the way the *group process* worked. Seven questioned *other's motives*, and the remaining six examined the *dynamics of the group*.

Resistance. (0 instances) Participant 5 does not make any statements that suggest a resistance to change, suggestion, or improvement.

Participant 5 summary. Participant 5 gave no evidence of cognitive change. She made no statements that directly referred to a change in her thinking. Her concepts of leadership, power, and identity did not appear to change. Her description of leadership remained consistent throughout the reflections. She described leadership as facilitating group processing and decision making to ensure inclusion and to encourage group members to participate. For 5, the most important aspects of identity are gender and age with race also playing a role. Participant 5 described a mixed (Brunner, 2002), or situational, approach to power. She did not approve of power over as exhibited by participant 1, and she associated this exercise of power with men. She did approve of a facilitated power over approach as used by 6 because it was "moving the group along through the process," and 6 was "very careful about including everyone's point of view."

Participant 5 displayed several factors associated with potential change. She described an inner conflict between wanting to become a solution to the chaos and poor behaviors of some classmates and wanting to fade into the background or even

disengage. She was frustrated by the difficulty of chat space communication and her own lack of influence. She expressed openness to the ES© experience and what she could learn from it and engaged in reflective behavior (44 instances). Her reflections explored her thoughts, motives, and actions; the ES® process; the way the group processing worked; others' motives; and group dynamics. Participant 5 wrote nothing that indicated either resistance to change or learning through the experience.

Two factors may influence this lack of change, the first being that participant 5 entered the experience with an appreciation for the power with/to leadership approaches that ES© tends to foster. Second, 5 seemed to lack a strong sense of efficacy. She wrote frequently of her demons of self-doubt and timidity, which prevented her from engaging in the kind of behavior that enabled her to take charge of a situation. She wrote about the need to talk herself into bravery, and expressed fear about the group meeting face to face. She credited her increased involvement in the chat space to 4's invitation for her to take a leadership role in session two.

Interestingly, participant 5's own view of her influence contradicted reality and others' perceptions. Of the fifteen participants, 5 was one of the six most frequent contributors. Together these six conducted 60% of the discussions. Other participants, including participant 1, named 5 as a positive and encouraging influence.

Participant 5 did not seem to recognize her need for a more sophisticated concept of identity. Despite plentiful reflection in other areas, she did not reflect on issues of identity. Participant 5's conception of identity was primarily an issue of age, gender, and to some extent, race—and it didn't appear to grow. She did not reflect on issues of power and identity, despite the fact that her role dramatically changed in

sessions two and three *after* the participants saw a pseudo photo of her as a man. Her thoughts seemed to be most concerned with the behavior of fellow classmates and her self-inflicted inability to address it.

Observations about Participant 6

Anomaly. (2 instances) Participant 6 was startled when he first saw the pseudo images because they did not represent his experience as either an educational leader or a graduate student. He wrote,

> I have taken MANY courses at the University of Minnesota. I have never encountered such a diverse group of people. I have been on hiring committees for MULTIPLE high level administrative positions, and I have never seen the diversity of candidates represented. I am part of MANY local and national organizations, and I have NEVER experienced the range of diversity that is represented in the photographs.

Attitude—emotions. (34 instances)

Anger. (2 instances) Participant 6 expressed anger stemming from feelings of manipulation through the use of pseudo images to force interactions based upon false identities.

Annoyance. (2 instances) Participant 6 was annoyed by his fellow groupmates' use of sarcasm. He was also annoyed by what he perceived to be manipulated interactions based upon the use of pseudo images: "I am starting to build a cynical attitude because I am seeing this as a "forced" activity rather than a genuine one."

Blaming. (7 instances) Participant 6 blamed his feelings of frustration on the ES© process. "Trying to generate a power reaction that is not genuine seems contrived

and insignificant," he declared, but added, "I think we accomplished what we were able given the interpersonal environment that was created." He also blamed the instructor:

> I was extremely disappointed with the level of the conversation and was not at all accustomed to this "level" of conversation (topics of beer, extreme sarcasm directly offered to other members of the class, etc.) being tolerated in any of my masters or doctoral courses.

After the final chat session, he began to shift blame for his lack of engagement and learning away from himself and toward his classmates.

> What I would like is to learn from each other. One of the most important factors of a class is that it includes healthy dialogue. I learn from that dialogue. When that dialogue is negative, I read it as a waste of time, energy, and opportunity.

Confidence. (4 instances) Participant 6 expressed confidence in the experience and his role within it only after the second chat session in which he was given the lead facilitator role. "I thought this session went much better and provided more inclusive experiences for individuals," he reflected. This confidence did not remain after session three.

Frustration. (16 instances) The source of participant 6's frustration seemed to shift over the course of the chats and reflections, while his degree of frustration increased. In his first reflection, completed immediately following chat session one, participant 6 said he was frustrated by the lack of assignment clarity, the number of people trying to chat online at once, and the sarcastic comments of some. While concerned, he seemed to consider his level of frustration to be in keeping with the

general frustration the class was experiencing. He noted, “It was apparent from the conversation that many people experienced frustrations because of these issues.”

Two days later, after seeing photos of his class which he suspected to be false, his frustration appeared to increase. “I am, quite honestly, feeling VERY frustrated with this process,” he confirmed, “and I am struggling to see how this exercise ties into the skill set that will be required of me as a superintendent.” He also indicated that he wanted to drop the class, but needed to take it at this time due to his schedule.

Participant 6 felt better after session two because he was accepted as the facilitator and the group was productive. Two days later, however, after viewing the pseudo videos, he was sure that the identities given to his classmates were false. His frustration again increased, to the extent that he refused to answer the set of reflection questions which profiled the other group members. Instead he expressed his frustration to the course instructor. He complained,

> I am having an EXTREMELY difficult time with the profile questions. Taking my time to answer questions to fictitious persons in this class is not an activity that I believe will help me understand the skill sets necessary to function in the superintendency. Will I be penalized if I choose not to respond to these questions? If I will I will answer them out of necessity.

He went on to reveal the source of his mounting frustration:

> I want to keep an open mind about this part of the experience but as a person who lives as a minority on a daily basis I find the manipulation contrived; it makes me angry to respond to something fictitious.

Participant 6's frustration reached its highpoint during the first part of session three, prior to participants' true identities being revealed. Of that time he wrote,

> Horrible! Very little leadership and much chaos again. I find it frustrating—not due to the environment. Persons were disrespectful to one another, dominated the conversation, formed coalitions and brought the level of interaction to an all-time low.

Joy-excitement. (3 instances) Participant 6 expressed joy in the course process after the second session, before watching the pseudo videos. "I actually enjoyed this session," he announced. He also expressed his satisfaction with the last half of chat session three (after their real identities were revealed): "I enjoyed the discussion when persons revealed their identities."

Background Knowledge. (14 instances) Participant 6 frequently alluded to experiences or training from outside that helped him within the chat environment to understand group dynamics, to help the group accomplish its task, and to anticipate future problems. Some of these observations referred to knowledge he had gained from experience:

- "When I am frustrated I look to process and outcome as a comfort. If it is not present, I tend to create it to help me understand."
- "My experience has been that I am more likely to receive those types of comments from men rather than women."

Others referred to knowledge he learned intentionally through professional development settings.

- "I use consensus building tactics and Adaptive School techniques that I have learned over the years of facilitation I have been a part of."
- "As a person who is working on a dissertation that explores the results of online learning environments, one of the benefits persons identify is that there is no identity that is predetermined by anything other than what is typed and expressed."

Participant 6 also referred to knowledge of videography, which enabled him to identify the pseudo videos as false.

> The quality of my real media video clip was not anywhere near the professionally produced quality of the other video segments. The professionally produced segments had the 3/4 eye-line very distinct, back lighting to illuminate the person, and the audio quality of the recording was distinctly different for mine versus the rest.

Change evidence. (0 instances) Participant 6 did not express any changes in thought or understanding.

Cognitive conflict. (21 instances) Participant 6 experienced conflict between how he wanted to lead and how he actually did lead. He described this inner struggle at least seven times. Frustrated by the lack of organization, he took charge by providing a plan for creating order and carrying that plan out. "I took ownership of a process to help ease my own frustration," he acknowledged. Wanting to create order and enable a power with/to environment (Brunner C. C., 2002), participant 6 assumed the role of facilitator. He explained,

> I am not as controlling as the transcript communicates. I tend to organize and then step back to let the flow of ideas and input guide process. I also want them to know that I am genuine in my desire to include those voices that are usually excluded rather than included. It has been a hallmark of the work that I do on a daily basis.

Still, he received feedback from some group members that his actions demonstrated power over (Brunner C. C., 2002), and were not appreciated. “I tried to establish order in the conversation as a matter of self-preservation,” he maintained. “I think this created an undue tension for people, and I need to apologize for this.” He added,

> There was very clear feedback that some already had strong opposition to what I was doing, and I will need to take that into consideration as I think about what direction I will take during the second section of this work.

It appeared that participant 6 was conflicted by how to approach the ES©. Logically, he desired openness to the learning experiences, but emotionally he struggled with a fear that the manipulation would lead to some sort of negative judgment against him. This conflict began between sessions one and two, after participant 6 viewed the pseudo photos. He wanted to believe the photos were real, but feared the result if they were not, claiming, “I am either incredibly excited by the prospect that the face of educational leadership is changing or I am led to believe that what I am seeing is not real.” The possibility of false identities being used to manipulate power within the group particularly concerned him:

> I am, quite honestly, feeling VERY frustrated with this process, and I am struggling to see how this exercise ties into the skill set that will be required of me as a superintendent. I am still trying to keep an open mind to the process and trust that it will bring about a good result. But, I would honestly say that if I could take this class and not be subjected to this study, I would.

The conflict between wanting to engage in the learning process and fear of suffering at the hands of a manipulated process increased after the pseudo videos were shown. “I felt manipulated with the photo images and I am feeling more manipulated by the video presentations,” he declared. “I am trying to be open minded, but it is very difficult as I am now certain that they are not my actual classmates.”

As participant 6’s conflict continued, he struggled to understand its source. He commented,

> I want to keep an open mind about this part of the experience but as a person who lives as a minority on a daily basis I find the manipulation contrived; it makes me angry to respond to something fictitious.

After Participant 6 saw the false photo that represented him, he once again referred to his conflict between emotional shut-down and a desire to be open:

> I really do not like the manipulation involved in this study. Trying to generate a power reaction that is not genuine seems contrived and insignificant.” “I hope you find information in your study that proves me wrong. Maybe I have been turned off to some significant learning that will result. I wish you the best with the work you are doing here; I believe it to be crucial.

When everyone's ture identity was revealed following the third (final) chat session, participant 6 expressed his fear of coalitions forming among those who knew each other from previous contexts. He speculated,

> I am still concerned about the coalitions that will form during the class. It seems like a large number of the class is already familiar with one another, and that has me concerned. I have seen coalitions work in very negative ways, and I am not looking forward to the first part of the class.

Insight into the source of participant 6's conflict can be gained from other sections of his reflections. Early on, participant 6 explained how he took control and likely alienated some group members. He confessed,

> "I think others need to know that I am not as controlling as the transcript communicates. I tend to organize and then step back to let the flow of ideas and input guide process. I also want them to know that I am genuine in my desire to include those voices that are usually excluded rather than included.

Elsewhere he wrote,

> I think others will be mad and frustrated with me. I took a process and directed it to a place that they may not have wanted to go. There was very clear feedback that some already had strong opposition to what I was doing, and I will need to take that into consideration as I think about what direction I will take during the second section of this work.

Perhaps participant 6 feared that new coalitions would target him. He expressed a fear of meeting the group face to face and began to speak about the importance of an inclusive environment. It appeared that he now wished he had played a different role.

He wrote, “I would have liked to have a group facilitator organize the interactions and provide for an inclusive learning experience.”

When asked what he wanted to have happen in the face-to-face session, 6 responded, “Decent treatment of all individuals.” He also wanted the instructor to impose “ground rules and defined purpose” for protection. He explained, “If these are open and undefined, the group lacks purpose, vision, and no guidelines for the expectations of how members can expect to be treated.” Participant 6 hoped the instructor would intervene more in future sessions than the instructor had during the course so far: “I expect that many persons are not sharing their true feelings or experiences, for a lot of tolerance for unacceptable behavior has been taking place.”

Disorientation==loss of sense making. (3 instances) Participant 6 explained that the lack of a defined process or specific outcomes for the group task required him to impose order to help him regain meaning. When the group reacted to his leadership differently than he was used to in the real world, this discrepancy confused him.

Efficacy. (27 instances) Participant 6’s reflections initially depicted the strongly positive self-efficacy (19) of one charged and ready to take control, but began to turn after he viewed the pseudo videos of his classmates. Things worsened four days later when he saw the false photo that represented him to his classmates. After those two moments—especially after seeing the mask that represented him—his reflections indicated the strongly negative, or low, efficacy (8) of one who was hesitant and lacked control.

After session one, participant 6’s reflections displayed a positive self-efficacy. In fact 12 of the 19 coded instances of his positive efficacy appeared in the two

reflections immediately following session one. The chat session was four hours long and ended at 8:30 pm. It is interesting to note that participant 6 posted his first two reflections at 8:58 p.m., and 9:31 p.m., respectively. He was also the first participant to enter the chat space on that evening, giving evidence of his eagerness to accomplish the tasks.

Participant 6's early reflections portrayed an individual who controls his own destiny and the destiny of those around him. He was confident in his abilities and believed he had much to offer in helping others be productive. He was frustrated by the chaos and the inability of his class to set a clear direction so he took a leadership role to ease his own frustration and regain a sense of control for himself and the group. He stated,

> I took ownership of a process to help ease my own frustration. When I am frustrated I look to process and outcome as a comfort. If it is not present, I tend to create it to help me understand. I hope I did not come across too strong in the chat this evening.

Although most appreciated 6's leadership, some resented it. Participant 6 noted his leadership role and the negative reactions of others, and developed a plan for a successful outcome in future chat sessions. He wrote,

> I tried to establish order in the conversation as a matter of self-preservation I identified in the task questions. I think this created an undue tension for people, and I need to apologize for this. I will take ownership of that.

He went on to explain, "There are parts of my personality that I need to monitor and watch as I participate in a group as a member and/or facilitator." Participant 6 indicated

that he is completely in control of how others react to him, and of his future success or failure. He determined, “I will try to control my responses and bring them back to a level where others can offer more suggestions and input.”

Participant 6 planned to maintain a strong leadership role in future chat sessions, but to make sure others had a chance for input. He cautioned, “I need to be mindful of the inclusion people are feeling as we do our work together.”

At the start of session two participant 6 first tried to defer the facilitator role to others, but was persuaded by the group to take the mantle. The session ended at 8:21 pm, and participant 6 submitted his reflections at 9:03 p.m. and at 9:14 p.m. that same night. Again, he wrote confidently about his ability to facilitate, and indicated his skills were key to the group’s success. He noted, “I tend to facilitate. I like to bring the ideas to discussion and get groups working together.” He felt confident in his leadership style. “I think some will look at my style as pushy, and I am comfortable with that as long as I feel I am inclusive and respectful during the course of the work,” he wrote, adding, “I use consensus building tactics and Adaptive School techniques that I have learned over the years of facilitation I have been a part of.”

He expressed his belief that others liked having him as the leader, statiing, “I again played the facilitator. I think because I played that role for session one, persons were trusting of the results.” He planned to continue this role in future work: “I will keep focusing my facilitation efforts to be inclusive and to keep us directed to completing the task to get done by the 4th session.”

Participant 6 again responded promptly to the reflection questions after viewing the pseudo videos, but expressed that he knew the images of his classmates were false.

He spoke of not liking the feeling of “manipulation,” and although he wrote confidently about the quality of his voice, his comments subtly shifted away from his being in control of how others perceive him, to his reliance on their perception. He noted, “I hope that others would say that I keep a respectful volume and communicate in a clear, succinct manner.”

Four days later, participants were allowed to see the photo that represented them. They were instructed to respond to a set of reflection questions before the next chat session, eight days later. In contrast to his other reflections, participant 6 did not submit these new posts in a timely manner. In fact, the instructor needed to prod him to do so on the day they were due. Participant 6 submitted his reflection at 4:21 p.m. in the last moments before entering the chat space for the third session at 4:23 p.m.

After the third chat session, participant 6 waited a week to submit his final reflection. Whereas his reflections after sessions one and two were submitted immediately following and expressed confidence in his control of himself and the group, his final reflection—separated from the chat session by seven days—expressed that he had no control over how others perceived him, stated that he was at the mercy of outside forces, and complained that he needed someone else to take control of this course if things were to go well for him in its future.

He no longer wanted to be in control and did not feel he could control the outcome of the class. He commented, “I do not want to be the facilitator in a class that I want to be learning in.” He felt that conditions outside of his control must change for him to be successful, adding, “I know that in order for me to bring my skills into an organization, there has to be a healthy sense of respect, understanding, and value for the

treatment of employees." Participant 6 stated that the class environment was one of disrespect and an environment in which he could not thrive. He began to make excuses for why he was not successful: "The work was not clearly defined, orders were flying from multiple sources, and the level of respect found an all-time low."

He was concerned about "coalitions" that may form in future work, and he blamed others—possibly the instructor—for not controlling the situation so he could be successful. "A lot of tolerance for unacceptable behavior has been taking place," he accused.

Identity. (10 instances) Participant 6 primarily associated issues of identity with gender, race, age, and socio-economic status. He frequently referenced the stereotype of the white, middle-class male as a person of power, and referred to himself as such a person. He pictured people as male or female based upon their behaviors. He confessed, "I do have these preconceptions. I don't like that I have them, but I do."

He reacted defensively to accusations of discrimination. In response to criticism of his use of the pronoun "him" when referring to a classmate, he explained:

> I did it not as an intentional assumption that the person was male, but that it was the way that I have been taught to refer to a singular pronoun. I wonder if I would have used "her" all the time if I would have received the same reaction.

He identified himself as a white male, stating, "There is little unique about me other than the fact that I appear to be a white male who is a traditional power broker." Although being a white male is not usually associated with being a minority, he claims to be one:

> I want to keep an open mind about this part of the experience but as a person who lives as a minority on a daily basis I find the manipulation contrived; it makes me angry to respond to something fictitious.

His defensiveness left the impression he felt as if his identity were under attack. After the pseudo photos were introduced, participant 6 described others as thinking of him as "a white male who is a traditional power broker." When he realized that his identity had been masked to others he became concerned. After his real identity was revealed, he feared that other members of the class might gang up on him in the first face-to-face session. He may have feared that the discussion would turn to the assumed power of white males and that he would be the target. He cautioned, "I have seen coalitions work in very negative ways, and I am not looking forward to the first part of the class."

Influence. (31 instances) Participant 6 described classmates that were "assertive," "sarcastic," and "authoritarian" as influential in a negative sense. He put both himself and participant 1 into this category. He first described 4 as a negative influence, but changed his description after session two.

Participant 6 described classmates who offered "insight," "synthesize" ideas, or guide through questioning or suggestions as being positive influences. He puts 3, 12, 5, 8, and 9 in this category. Interestingly, participant 6 appeared to be in conflict over his own role. He saw himself as being "pushy" and taking control of the group process—traits which he attributed to others as negative. He wished for influence by support and insight which he described as a positive trait in others. He stated, "I wanted to take a more supportive rather than a leadership role. I wanted to offer insight, not direct the

solicitation of ideas and procedure monitoring." Participant 6 described his own authoritarian role as both negative (5) because he was "pushy" and positive (4) because he helped provide order.

Leadership. (25 instances) Participant 6 described leadership in terms of leaders and followers. He pictured a leader a patient facilitator who provides ground rules, a process, and a purpose to enable group members to work together with respect and understanding. He envisioned followers as those who trust their leader and cooperate. He claimed, "It works better once the ground rules have been established and persons are willing to give their trust to a person who is willing to facilitate the conversation and procedures."

His conception of leadership remained the same from beginning to end. In his first reflection he outlined the need for process, ground rules, and a common purpose. In his last reflection he again described the importance of ground rules and defined purpose.

He described his own leadership as putting in place a process to provide organization and allow groups to do their work. He believed himself to be "calm," "compassionate," and "inclusive," possessing "skills in facilitation and respectful communication." He believed that he typified what he perceived as good leadership, having skills for inclusion and gaining the trust of followers. "I again played the facilitator," he reflected. "I think because I played that role for session one, persons were trusting of the results."

Although in the beginning participant 6 described feeling a need to be the facilitator, in the end he expressed some dissatisfaction with his role. He claimed, "I do

not want to be the facilitator in a class that I want to be learning in." He further explained, "I would have liked to have a group facilitator organize the interactions and provide for an inclusive learning experience."

Openness—willingness to change. (23 instances) Participant 6's expressions of openness to change can be divided into three categories. One is the willingness to examine weaknesses and learn from them. The second is a desire to not rush into judgment but to understand others better. The third is a willingness to keep an open mind about the ES© process despite his misgivings.

At least eleven of his statements reflected a desire to examine his weaknesses and learn from them—comments like, "I will try to control my responses," and "[I] would invite suggestions on how to do that differently."

Participant 6 makes six statements about his willingness to be open to the ES© process, but at the same time he is skeptical:

- "I am trying to suspend my judgment until it is completed, but I had to get the part of frustration off my chest."
- "I want to keep an open mind about this part of the experience, but as a person who lives as a minority on a daily basis, I find the manipulation contrived."
- "I am VERY open to discussing this further after this online experience has been completed."

Power. (35 instances) Participant 6 believed in a power with/to forms of leadership, but envisioned it being carried out in a power over manner. He described his leadership style in terms of power with/to, writing, "My goal is to get the work done in

a calm, compassionate, inclusive manner. Any part I can play in helping that come to a reality would work for me." He explained that in the real world others considered him as using power that way: "I usually am known for my skills in facilitation and respectful communication. Persons like to serve on committees I facilitate for this reason. That is the feedback I have received over time through multiple observations." Nevertheless, participant 6 found himself acting in a power over manner. He observed,

> I tend to facilitate. I like to bring the ideas to discussion and get groups working together. I think some will look at my style as pushy, and I am comfortable with that as long as I feel I am inclusive and respectful during the course of the work.

He also considered, "People may have thought of me as more 'pushy' as I tried to get the group to move in an agreed direction and find progress," adding, "If anything they might be thinking that it is no doubt I was male because I took a leading role in defining the conversation style and structure."

The contradictions between participant 6's stated beliefs and actual practice may be an example of the "high fidelity" (Brunner C. C., 2002, p. 703) observed between a person's "ontologically held conception" (Brunner C. C., 2002, p. 703) and actions. As Brunner (2002) described:

> [People] who conceived of power as over others, viewed collaborative action through the lens of power-over. That is, they believed that collaborative groups were to be led by one individual who had permission to enact his or her own power autonomously or some variation of this belief. (p. 703)

Participant 6's statements agreed: "It [decision making] works better once the ground rules have been established and persons are willing to give their trust to a person

who is willing to facilitate the conversation and procedures." Participant 6 applied this leadership role to himself. He explained, "I again played the facilitator. I think because I played that role for session one, persons were trusting of the results." He also expressed satisfaction with his control of the group: "I think persons were more open to facilitation and the necessary processes involved in decision making."

Participant 6's concept of power did not change, but his confidence in his own leadership did. "I do not want to be the facilitator in a class that I want to be learning in," he stated, "I think it places persons in an awkward position because the group views the person with either disdain or reservations." As time neared for the group to meet face to face, he wrote about his fears: "It seems like a large number of the class is already familiar with one another, and that has me concerned. I have seen coalitions work in very negative ways, and I am not looking forward to the first part of the class."

Reflection. (24 instances) Participant 6 provided several examples of reflection—upon his actions, the actions of others, and the ES© process. He reflected or explained his actions on at least seven occasions. For example, he explained why he took a leadership role, why he made a gender pronoun mistake, and why he came across as negative about the ES© experience. He stated, "I took ownership of the process to help ease my own frustration. When I am frustrated I look to process and outcomes as a comfort."

Participant 6 also gave several examples of metacognition, or thinking about his thoughts. He observed, "I do have these preconceptions. I don't like them, but I do." Participant 6 frequently speculated on the reasons for others' actions. He mused, "I

want to know what they did not say. What were they holding back on during the discussion and what would they have offered if the environment was different?"

At times, participant 6 compared his experiences in the chat environment to those in real life. He complained, "The sarcasm they used would have 'crushed' a student in a K-12 class." Finally, Participant 6 wrote about the ES© process and his feelings about it. "I am not usually a person who is 'difficult' or tries to cause an disruption, but this experience has left a very sour taste in my mouth."

Resistance. (19 instances) During the ES© process, participant 6 experienced a shift from openness to resistance. This change was concurrent with his discovery that the identities of his classmates were being manipulated. His skepticism began when he observed the pseudo photos of his classmates, yet he kept an open-mind: "I am either incredibly excited by the prospect that the face of educational leadership is changing, or I am led to believe that what I am seeing is not real."

After the second chat session, 6 showed some signs of resistance. He chose not to acknowledge the pseudo photos, or the fact that they affected him. He wrote, "I didn't refer to any pictures during the discussion, and I really didn't pay much attention to the pictures because I did not believe them to be real."

After he saw the videos and was convinced his classmates were masked, he began to use terse responses to questions regarding power and identity and refused to expend energy toward this portion of the reflections, asking, "Will I be penalized if I choose not to respond to these questions?" He explained that he knew they were masked "the first time I viewed the photos. It made me resentful and shut down my

desire to continue with the course and the study." His examples of resistance mirrored his apparent change in self-efficacy.

Participant 6 summary. Participant 6 was a very curious case. According to the transcripts, 6 was very active in the chat space and at least 93% of his comments were coded as low conflict/low emotion. He played a major role in directing the group's activities in chat sessions one and two, and a lesser role in chat session three. His classmates found him to be very influential. Eight classmates felt his influence was positive, two were neutral about his influence, and only two were negative. From this outside perspective, 6 appeared to be an unlikely candidate for cognitive conflict or change.

Participant 6's reflections, however, told a different story than the chat room transcripts and the reflections of his classmates. His reflections revealed a high amount of cognitive conflict (21 incidents), at least four times more than any of the other five participants whose reflections were analyzed. He also displayed more frustration than any of those classmates. In addition—unlike the others whose incidents of openness verses resistance showed an inverse relationship—participant 6 had roughly an equal number of statements of openness (23) and resistance (19).

According to his reflections, 6 entered the experience with a strong sense of positive self-efficacy and a high degree of background knowledge. He used his background knowledge to diagnose the environment and to direct a process to achieve a semblance of order and productivity. Most of his classmates were appreciative of his efforts, but some were critical. Her noted, "I tried to establish order in the conversation

as a matter of self-preservation . . . I think this created undue tension for people, and I need to apologize for this. I will take ownership of that."

Participant 6 revealed two causes of his cognitive conflict. The first was a conflict between his envisioned and his enacted use of power in his leadership style. He wanted to see himself as an able facilitator who used learned skills in communication and consensus building. Brunner (2002) described this as using power with/to. Participant 6 explained, "I use consensus building tactics and Adaptive School techniques that I have learned over the years of facilitation I have been a part of." However, the reactions of some classmates and his own review of the transcripts led him to believe he was actually exerting power over (Brunner, 2002). The following reflections reveal the conflict between his power with/to beliefs and his power over actions:

- "I think others need to know that I am not as controlling as the transcript communicates. I also want them to know that I am genuine in my desire to include those voices that are usually excluded rather than included. It has been a hallmark of the work that I do on a daily basis."
- "I think others will be mad and frustrated with me. I took a process and directed it to a place that they may not have wanted to go."
- "I usually am known for my skills in facilitation and respectful communication."
- "I think some will look at my style as pushy, and I am comfortable with that as long as I feel I am inclusive and respectful during the course of the work."

- When asked in his last reflection how he would have organized the Task Force work if given the chance, he responded, “I would have worked to get input from all members.”

The second cause of his cognitive conflict arose from participant 6’s issues of identity. He described himself as a white male in an educational leadership position. In response to his photo, 6 wrote, “There is little unique about me other than the fact that I appear to be a white male who is a traditional power broker.” He was sensitive to the accusation that his identity afforded him privilege and power, and he wanted to be open to widening the circle of power. He stated, “I also want them to know that I am genuine in my desire to include those voices that are usually excluded rather than included.” After seeing the diverse pseudo photos of his classmates, he doubted they were real, but noted,

> If it is [so], I will try to network with individuals and learn more about what brought them to education and how such a diverse group came into the interest of a profession that is typically reflective of the past power base—white, male, and middle-class.

Still, participant 6 may not fully believe the accusation of privilege due to identity is true. He seemed defensive about identity issues. For example, he wished to explain his use of the pronoun “him” when referring to a classmate during the first chat session. Furthermore, despite being in fact a white male, he claimed that he “lives as a minority on a daily basis.” Participant 6 expressed openness to issues of power and identity, claiming, “I am VERY open to discussing this further after this online

experience has been completed," yet he refused to engage in the exercise, calling it "contrived."

Participant 6 reacted to the cognitive conflict—especially that caused by issues of identity—by shutting down. He explained, "It made me resentful and shut down my desire to continue with the course and the study." His mental shut down was evident in several ways, and it can be clearly linked to the pseudo identities. After viewing the videos confirmed for him that the representations of his classmates were not real, the contrast in his written reflections was stark. Prior to that time, participant 6 gave prompt, insightful reflections that portraying a very self-confident individual. After the introduction of the pseudo videos, his reflections were marked by blaming, refusal to engage in the questions, and expressions of fear and helplessness.

Despite his expressions of openness, participant 6 gave in to resistance and did not indicate any type of change. Part of the reason for his inability to change may be that he did not feel he was in a safe environment where he could take risks. Participant 6 wrote about his concerns after the final chat session: "Persons were disrespectful to one another, dominated the conversation, formed coalitions, and brought the level of interaction to an all-time low." He was especially concerned that coalitions would form that would "work in very negative ways, and I am not looking forward to the first part of the class." Participant 6 recognized that the environment was not a good one for him:

> My strongest learning was not a positive one. I had many reservations and still do that this environment will be a successful learning one for me. I am very concerned that the negativity will continue into the face-to-face conversations. I

am tired of having to confront persons who are not respectful and considerate of all the class members.

He may have believed that he would be the target of negative coalitions due to his previous role as facilitator within the group. Although he took over as facilitator in the first session and spoke favorably of his work as facilitator in the second, after seeing the photo that masked him, he changed his position. He stated, “I do not want to be the facilitator in a class that I want to be learning in. I think it places persons in an awkward position because the group views the person with either disdain or reservations.” He added, “I felt like more negativity was placed in my direction.”

Although participant 6 imagined himself an inclusive leader, he recognized that the role he played in the chat sessions fulfilled the stereotype of a white male. The transcripts and other participant’s reactions led him to question his self-concept as an inclusive leader. Fear of entering a hostile environment without the instructor taking control of the conversation led him to disengage from the learning.

Nomothetic Data Analysis

A nomothetic approach to data analysis provides a broad picture of educator cognitive change dynamics aggregated across individuals. The aggregate view allows for comparisions between individuals and the possible identification of 1) commonalities and differences between individual experiences; 2) patterns of behaviors or reactions; and 3) relationships between coded factors. Using the coded factors, I moved iteratively between the literature and the data. Situating the aggregated data within the literature provided another layer of meaning and helped verify the findings. The following themes are explored: 1) Leadership, 2) Power, 3) Anomaly, 4) Cognitive

Conflict, 5) Disorientation, 6) Self-Efficacy, 5) Background Knowledge, 6) Openness / Willingness to Change, 7) Reflection, and 8) Resistance.

Leadership

Educational leaders are encultured into conceptions of leadership. Educators are deeply entrenched in the traditional concept of a leader exerting top-down authority and having traits or skills which dispose him or her to make decisions others follow (Barnard, 1938; Pfeffer, 1977; Stogdill, 1950). This contrasts with contemporary views of leadership that promote shared authority, shared responsibility, democracy, and decision making at the lowest possible level (Bass B., 1990; Bass & Avolio, 1994; Wheatley, 1999).

The participant reflections revealed that each participant began the ES© with their own meaning scheme about leadership. A participant (participant 1) described leadership as using her authority to make top-down decisions that she expected others to follow. Her view of leadership did not change over the course of the ES©. She wrote, “As a leader, I would play favorites with the people who bought into my vision and supported me in getting things done.”

Initially, two participants (2 & 3) understood leadership to mean one person to whom others look for guidance. In his first reflection, participant 3 described how he views leaders and followers:

> In order for me to line up behind someone and follow their leadership, I like to know that they aren't going to lead me off of a cliff. I also want to know that they actually know what they are doing and that I might have an opportunity to offer assistance to them as they lead the larger group.

Participant 2's description mirrored that of 3. She said, "I believe that people naturally look for a leader. We have been conditioned to have someone assume that role."

Both 2 and 3 saw the leader's role as making decisions that affect others. The leader's decision may or may not be influenced by input gathered from trusted followers. The main purpose for gathering input was to gain "buy-in" from those affected by the decision. Participant 3 described how leaders make decisions as follows:

> One must know what the "givens" are and then use that knowledge to move forward with the decision making. Inputs from all or many of the stakeholders can be instrumental to making a good decision. Analysis of each of the facts allows decision makers the opportunity to assemble a game plan that can be backed by a solid rationale. Having a good rationale is what saves decision makers when the decision may not work out like was hoped.

Participant 2 explained how she behaved as a leader:

> My leadership style can be considered situational. I can be inclusive when I need to be, however, I can also make those tough decisions that no one wants to make. I consider the ideas of others, yet I have been accused of already knowing what I want.

Both participants (2 & 3) changed to a more democratic view of leadership. Participant 2 reported that as a result of the ES©, she tries to prevent her position from interfering with group decision making. Participant 2 describes her new view: "The most important thing in a decision making process is to understand how the group is going to make the decision; as well as the decision making power of the group." Participant 3 demonstrated his change by emphasizing the importance of group

decision-making. “If a leader goes through the group process there is greater assuredness that others will be in support of new initiatives, etc.”

Three others (4, 5, and 6) entered the ES© believing leaders are ones who organize a work environment that provides inclusion and group decision making. Their ideas about leadership did not change (see Table 7, p. 168).

Power

Closely aligned with leadership, is the way one understands and uses power. Power is seen as influence and control. The traditional and common use of power is that of “power over” (Brunner C. C., 2002, p. 695). Bruner synthesizes a literature-based description of power over as “power conceived as dominance, authority, control, influence, or power over others or things” (p. 696). An alternative conception of power is “power with/to” (Brunner C. C., 2002, p. 699). Again, Brunner provides a literature-

Table 7
Participants’ views about leadership.

Participant	Change	Race	Gender	Initial concept of leadership	Final concept of leadership
1	No	White	F	Leaders exert influence to accomplish the task.	Same
2	Yes	Black	F	Leader gathers feedback from others and makes decision.	Leader encourages stakeholders to be part of decision making.
3	Yes	White	M	Leader gathers info from preferred others and makes decision.	Leader provides structure for all to participate in decision making.
4	No	White	F	Leader organizes a platform for inclusion.	Same
5	No	White	F	Leader facilitates a group process and decision making.	Same
6	No	White	M	Leader creates structure (rules) and facilitates to ensure group work.	Same

based aggregate definition for power with/to as “a capacity to accomplish certain social goals through cooperation among people or groups with various interests and concerns” (p.699).

Four of the participants wrote about power in a way that suggested they began with a meaning scheme best characterized as power over. For participant 1, both her actions and written statements were consistent with an understanding of power as power over. In the chat space, participant 1 seemed to want control and to have the group follow her opinions. She bullied the group with sarcasm and ridicule to coerce compliance. She frequently told the group, “Read the assignment!” She responded to other participants’ input with phrases like, “Who cares?” During one period she repeatedly entered the same text, “Leadership, issues, vision, philosophy,” to cajole the others to follow her ideas for problem solving. Between sessions, participant 1 collated everyone’s ideas and used her work to set the agenda for the second session. In their reflections, other participants noted 1’s use of power over. Participant 3 wrote, “I think 1 is the most directive. 1 seems to take a ‘no prisoners’ approach to getting things done.” Participant 5 added, “Many of 1’s comments were directive like, ‘Why are you talking about individuals? Read the assignment.’ or ‘Who cares, 9, that is not the assignment.’” In response to her own approach, participant 1 acknowledged,

> “In session one I played the big picture task master role. I also played the stupid and repetitive idea police. But in session two I played the lead by example role. Why should you listen to me? Because I took all the ideas YOU ALL offered and made it a workable list . . . Once they were with me on the vision, I could push it forward with less hassle.”

Participant 1 did not change in her view of power. She wrote in her last reflections, “I’m a pain in the ass that gets things done.”

The other three participants who began with a power over concept were 2, 3, and 6. Unlike 1, they intially described themselves as holding a power with/to position, but their actions and/or reflections gave evidence of a power over meaning perspective. For example, participant 6 took over a facilitator role, and in this way controlled the conversation of the group. Although some made positive statements about participant 6 in their reflections, participant 4 stated, “6 irritated me because in my opinion he was too biased in his facilitation. Specifically, he would push for acceptance of comments made that he agreed with, but didn’t often acknowledge those he didn’t agree with.” Participant 6 also recognized the inconsistancy between his stated beliefs about power (power with/to) and his actions. He described how he wanted to use power: “My goal is to get the work done in a calm, compassionate, inclusive manner.” After reviewing the transcripts, however, he wrote,“I think others will be mad and frustrated with me. I took a process and directed it to a place that they many not have wanted to go.” Participant 6 gave no indication of a change in his approach to power, and instead seemed to withdraw from willing participation in the ES©.

Participants 2 and 3 both began with a similar view of their use of power. They described power as a leader making decisions after considering input from others, but only from selected people. Participant 2 wrote, “I consider the idea of others, yet, I have been accused of already knowing what I want.” Participant 3 stated, “inputs from all or many of the stakeholders can be instrumental to making a good decision. Analysis of each of the facts allows decision makers the opportunity to assemble a game plan that

can be backed by solid rationale." During the ES© both experienced how isolating it felt to not be included in the decision-making process and how their ownership increased when they were invited to participate. These experiences helped them to see the importance of sharing power with everyone. Participant 2 concluded, "The most important thing in a decision making process is to understand how the group is going to make the decision; as well as the decision making power of the group." Participant 3 decided, "I like group participation."

The two remaining participants (4 & 5) begin with a power with/to meaning perspective. Neither of their perspectives changed during the sessions. Participant 4 revealed her conception of power as "consensus on decisions, plenty of dialogue time, and an organized mode of deliberating so as to include all participants." Participant 5 wrote, "My style is to attempt to find ways for group members to work together successfully and to develop strategies that honor everyone's voice." She did, however, acknowledge that lack of time may limit the opporunity for group decision making.

Table 8
Participants' views about power.

Participant	Change	Race	Gender	Initial concept of power	Final concept of power
1	No	White	F	Power over	Same
2	Yes	Black	F	Power over	Power with/to
3	Yes	White	M	Power over	Power with/to
4	No	White	F	Power with/to	Same
5	No	White	F	Power with/to -situational	Same
6	No	White	M	Power over	Same

Anomaly

The literature suggests that an anomaly is one way in which the mind can be cued to preference reasoning over automatic responses. An anomaly does not fit the existing patterns or explanations associated with one's meaning perspective (Kuhn,

1962). A potential for cognitive conflict and disorientation occurs when an educator encounters an anomaly (Pajares, 1992). Educator cognitive change begins when anomalies are exposed. Exposure of an anomaly may assist in making a person's current belief system or biases explicitly known (Richardson, 1990).

Some participant statements were identified as evidence of an anomaly. An anomaly was defined as a surprise. It indicates that something—an event or expression by someone—occurred that is unexpected or doesn't fit what the participant considers to be the normal pattern. An anomaly may create a conflict and disorientation, but not necessarily. All participants had at least two statements coded as anomalies, due to the fact that each participant responded to two prompts asking whether they were surprised by anything. Four participants described being surprised by some aspect of the pseudo identities.

Participants 1 and 3 expressed surprise that the group pulled together as a team to accomplish the task. Although 1 and 3 both noticed that the group found a way to work together despite the chaos, only participant 3's realization led to change. Participants 3 and 5 were the only ones to have more than two references to an anomaly. They had seven and five references, respectively. They were also the two most reflective participants. The only two participants to change during the span of the ES©, were 2 and 3. Perhaps significantly, both expressed surprise at the group's lack of reaction to their inputs in the anonymous chat space. They described this as surprising because their ideas usually carry weight in the real world.

Cognitive Conflict

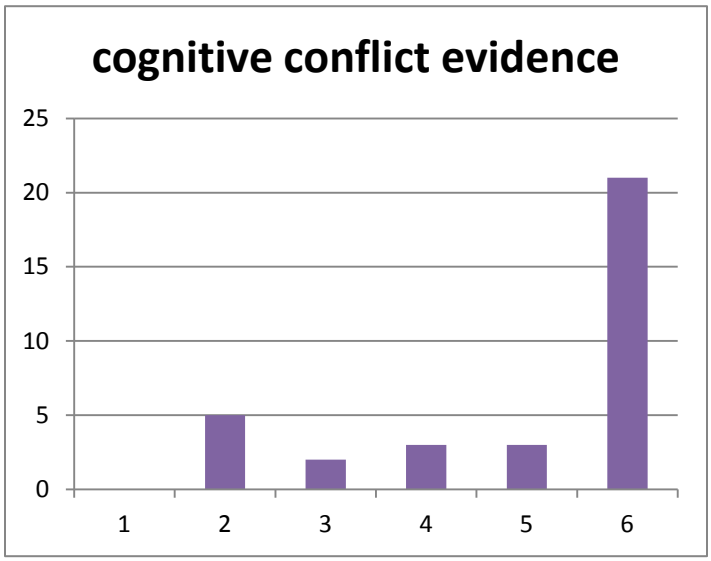

Figure 10. Cognitive conflict: individual instances.

Anomalies are one source of a cognitive conflict. Conflict can also occur when one's experience is contrary to what one expects or believes should occur (De Neys et al., 2008). Participants 2 and 3 both experienced this type of conflict. Participant 3 twice described how he provided "good input, but no one was listening," even though at work he will "speak to captive audiences." Similarly, 2 told how the participants in session one, didn't pay attention to her "excellent" suggestions. In response she became angry and shut down.

Conflict can also occur when the stimulus and response oppose one another (Egner et al., 2007). Participant 6 provided an example of such conflict when he shared, "I am trying to be open-minded, but it is very difficult as I am now certain that they are not my actual classmates." Participant 5 struggled between wanting to disengage from the course and wanting to be part of the solution.

Another source of cognitive conflict is errors committed by oneself or others (De Neys et al., 2008; Rubia et al., 2003). Participants 2, 4, and 6 all mentioned conflict caused by error. Participant 2 described how she realized that her impressions about her classmates were altogether wrong when she saw their real photos. "It was like I needed

to think for a moment. I actually could not respond on the computer for a moment." Participant 4 told of a similar conflict when the pseudo photos were revealed, and did not match her expectations based on the chat room behavior. Participant 6 expressed many conflicts including a realization that his imposed leadership resulted in others' dissatisfaction. He said, "I am not as controlling as the transcript communicates," and added, "I think this created undue tension for people, and I need to apologize for this."

Participant 1 did not share any evidence of cognitive conflict in her reflections. She described hurting others, but did not show any remorse or conflict about doing so. "Why did I have to waste my time with a bunch of bozos on a topic I could care less about?" she complained,

> There are still the talkers and the feelers and the do-gooders in every group. Barf. I was irritated beyond measure. Get on with it! Stimulate me intellectually, please! So I offered and demonstrated and did it myself. Here! Done! Enough already.

Neuroscience and cognitive psychology research provides possible explanation for participant 1's behavior. Sometimes conflict occurs but is not consciously detected (De Neys et al., 2008). Sometimes conflict is signaled in the brain, but a person responds according to an existing bias anyway (Deppe et al., 2005a; Lieberman, 2010). A person can also willingly favor one's meaning perspective in the face of contradictory evidence (Stanovich & West, 2008b; Westen et al., 2006). Finally, when a person's convictions are especially strong, the brain's error signal in the rACC may be weak or nonexistant (Inzlicht et al., 2009), making reasoned thinking unlikely. Any of these explanations may fit for participant 1.

Disorientation

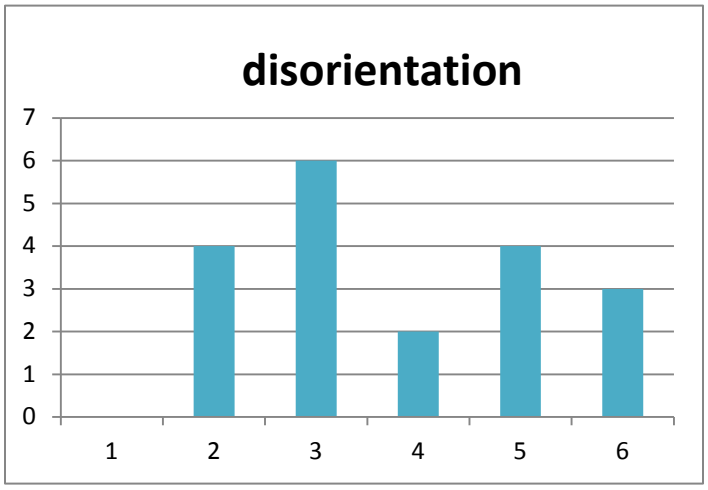

Figure 11. Disorientation: individual instances.

Disorientation occurs when one detects an environmental cue that the automatic response is inadequate but the person lacks the capacity to devise a better one. Change literature states that change involves a period of inner conflict. New data, or anomalies, occur that are inconsistent with what one expects (Cavanaugh & McGuire, 1989; Kuhn, 1962). A growing missalignment between one's meaning perspective and reality indicate errors and the result is a feeling of disorientation (Heifetz, 1994; Quinn, 1996; Weick & Quinn, 1999). This disorientation may be associated with the ACC signal that cognitive control is needed due to discrepant data. As a result, a mental struggle ensues between a reasoned response that agrees with the data and an automatic response supported by physiological changes (feelings). For the ES© participants in this study, disorientation seemed to occur for three reasons—the inability to make sense of information, a feeling of inner emotional conflict, and a loss of self-efficacy.

The inability to make sense of the information was noted by participants 3 and 4. Participant 3 described the "flurry of inputs" as overwhelming his ability to focus on solutions. He wanted "to exert greater presence but could not really think of ways to do it when limited with only keying in thoughts." He was frustrated by not being able to

use the usual cues of “proximity, projection, articulation, and physical gesturing” to create influence. Similarly participant 4 expressed confusion over not recognizing any of the classmates after viewing the pseudo photos. She was sure she would have known someone “from one of the many classes at the U!”

According to the literature, disorientation can be caused by the inability to make sense of inputs (Weick, 1993). Sense making relies on the automatic recall and application of previous experiences, or learned solutions that are part of one’s meaning perspective or schemes (Stanovich & West, 2008b). A cognitive conflict signals that the automatic processes are unreliable. Devising a better solution requires controlled processes, but they rely on a store of memories and emotions (Bechara & Damasio, 2005; Evans, 2003, 2008; Lieberman, 2010). Insufficient memories reveal a lack of adequate knowledge and skills, or “mindware” (Stanovick & West, 2008b, p. 687). This lack of background knowledge leaves a vacuum in which the person is unable to make sense of the situation (Weick, 1993).

Disorientation may also be caused by an inner emotional conflict. Such disorientation is evident in participant 2’s remarks. She described offering “excellent suggestions that were not given credence until mentioned by others.” In fact, she said no one noticed when she stopped participating. She was shocked because, “I am usually consulted about issues/concerns that are important to others’ work.” She became angry and decided not to respond to the group or sign off until the last person had done so. She explained her emotional reaction,

> I became angry and didn't 'play' at all. This I found to be frustrating and not typical for me in my daily work. I felt that I have only so much energy to exert so I took the easy path. I became obstinate!

This second type of disorientation, the result of an inner, emotional conflict, is also supported in the literature. When an error is detected, the rACC is activated (De Neys et al., 2008; Rubia et al., 2003). The automatic response is supported by emotional processing neural mechanisms such as the amygdala and ventromedial prefrontal cortex. These neural mechanisms trigger physiological changes that make the automatic response *feel* right (Bechara & Damasio, 2005; Mohanty et al., 2007; Rubia et al., 2003). Other responses *feel* wrong. The rACC signals that an error has occurred (Chiao et al., 2009; Van Schie et al., 2004), and that an analytical override is needed. However, if the person lacks the required knowledge (Stanovich & West, 2008b) or other internal capacities for cognitive change to occur, the conflict will be unresolved. The person will necessarily follow the heuristic response, yet experience frustration and display emotional responses such as sadness or anger. The person may attempt to rationalize the heuristic decision *ex post facto*, and may erupt in anger as he attempts to justify what feels right but cannot be understood differently, based on the mindware he possesses.

A third type of disorientation displayed by the participants involved a loss of self-efficacy. Some described feeling as if they were at the mercy of the process, with no ability to change things. Participant 5 served as a good example of this kind of disorientation. She acknowledged her lack of influence, saying, "I felt invisible last night and did not feel a connection to anyone in the group." She feared this would carry

over into other situations. “This observation makes me nervous about working somewhere new,” she considered. “Would I be invisible like Monday night?” She described feeling hopeless to change things: “I felt like a rat in a research laboratory and was wondering what any of this had to do with understanding the role of the superintendent in a school district.”

Again, the literature confirms that a loss of self-efficacy contributes to disorientation. Bandura (1993) described self-efficacy as “people’s beliefs about their capabilities to exercise control over their own level of functioning and over events that affect their lives” (p. 118). Those with strong self-efficacy are willing to engage in challenging mental activities. They view error as a means to grow and an indication that more effort is required. They see themselves in control of the change process and are willing to endure disequilibrium while holding to an expectation of future reward for their efforts. Those with weak self-efficacy consider error an indication of incompetence and avoid challenging situations. They feel out of control in the face of change, resulting in anxiety and stress.

Self-Efficacy

Efficacy may play a role in one’s ability to undergo cognitive change. “A strong sense of efficacy [is required] to remain task oriented in the face of pressing situational demands and failures that have social repercussions” (Bandura, 1993, p. 120). Sustained cognitive conflict and an openness to consider whether current beliefs are wrong require self-efficacy. A strong self-efficacy is associated with persistence in the face of challenge. A weak self-efficacy is associated with easily giving up (Bandura, 1993). For those with a weak efficacy, it is more important to appear proficient than to

expand their knowledge. Heuristic responses may be followed to preserve one's positive self-evaluation.

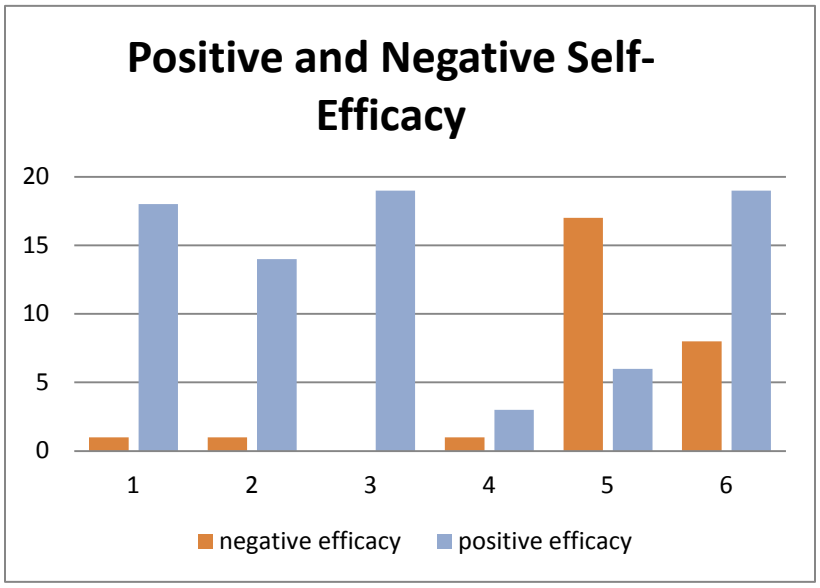

Figure 12. Positive and negative self-efficacy: individual instances.

It is difficult to determine the exact role the participants' self-efficacy played. Most participants displayed very positive self efficacy. The two participants that gave evidence of change both showed positive self-efficacy. Participant 3's efficacy was strongly positive. He wrote, "I am energized when a challenge or task is dangling in front of me." Participant 2 similarly stated that she could make "tough decisions" and "be stubborn and keep at it until I get what I want."

The two participants that resisted change (1 & 6) also displayed strong efficacy. Throughout the experience, Participant 1 expressed confidence in her ability to control the environment. Her confidence appeared inversely proportional to her lack of confidence in others. She wrote, "Too many people abdicate their personal creativity, energy and power by being passive, hesitant, people pleasers or followers. So I step in." It is possible that those statements that appeared to demonstrate positive efficacy are, in reality, a mask for weaker efficacy. In essence, she built herself up at the expense of others. She criticized, "I took the ideas YOU ALL offered and made it a workable list."

She asked, “Why did I have to waste my time with a bunch of bozos on a topic I could care less about?”

Participant 6, the other participant that resisted change, displayed both positive and negative efficacy, and his rise and fall of efficacy corresponded to his resistance. Prior to seeing the mask that represented him to the class, his efficacy was strongly positive; after that point it was negative. His efficacy may have been tied to his identity. His early reflections portrayed an individual who was confident in his abilities and who believed he had much to offer in helping others be productive. He said, “I took ownership of a process to help ease my own frustration,” adding, “I like to bring the ideas to discussion and get groups working together.” After learning of his pseudo identity, however, his efficacy clearly weakened. Instead of promptly submitting reflections, he needed to be reminded by the instructor to complete them. He wrote, “I had many reservations and still do that this environment will be a successful learning one for me. I am very concerned that the negativity will continue into the face-to-face conversations.”

Neither participant 4 nor participant 5’s conceptions of leadership and power were challenged by ES©, so it is unclear how efficacy may have affected them in this environment. While 4 gave few clues to her efficacy, 5’s efficacy was mostly negative—perhaps due in part to her honesty in her reflections. Participant 5 referred to “talking myself” into a positive frame of mind and having to “deal with one of my weaknesses.” She felt powerless to change the group’s ability to function, and confessed, “I won’t do anything much differently in session two as I did in session one.” Though she felt she had little ability to influence others, in reality, 5 was a major

influence through her role as an “encourager” and respectful listener. Participant 6 described her as “supportive, thoughtful . . . [an] excellent moderator,” and 1, 4, and 6 all described 5 as being a positive influence.

Background Knowledge

Theorists have long held that certain levels of knowledge and skills are necessary for cognitive changes to occur. Kuhn (1962) pointed out that discoveries of knowledge in science occur because new instruments for examination allow one to see alternative solutions. Weisberg (1999) demonstrated that major paradigm shifts in any field are the result of experts having all the necessary information to advance alternative solutions. Experts are immersed in the field and automatically recall and recognize patterns. Using the example of Watson and Crick, Weisberg (1999) claims they were not better thinkers, they just had all the information necessary to develop the correct model. In their research, Stanovich and West (2008b) found that one important factor contributing to reasoned thought over heuristics was whether one possesses the necessary knowledge and skills to solve a dilemma. Stanovich and West (2008b) refer to this as having the “mindware” (p. 686) required to

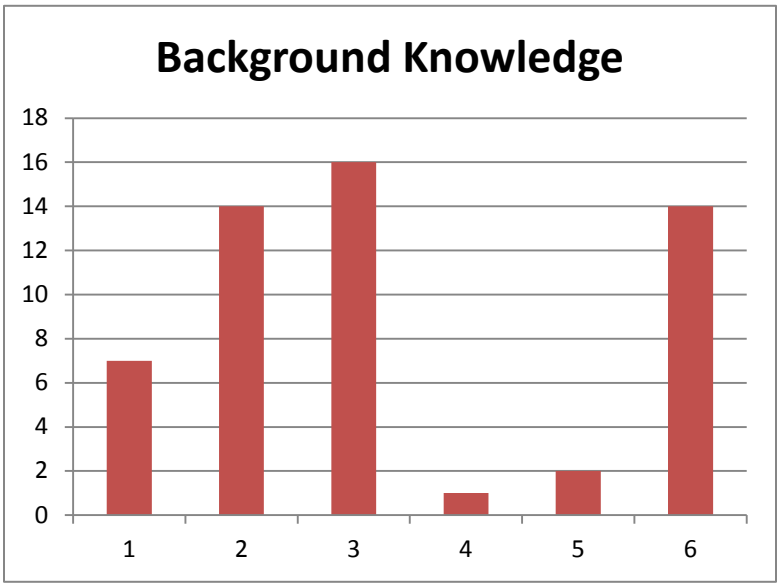

Figure 13. Background knowledge: individual instances.

come to an analytically correct solution. They claim that if a person does not have all of the information to reach a conclusion other than the heuristic one, then it does not matter what other capabilities may be present. Without the necessary knowledge and skills, one follows the heuristic path.

Of the ES© participants, 2, 3, and 6 referred to the knowledge or skills they brought with them and that proved useful within the experience (see Figure 13, p. 181). Participant 1 mentioned only the inability to utilize her existing skills within ES©. Participant 1 described how, in the real world, she relied upon knowledge of people's abilities to help her get things done and upon the use of body language and tone of voice to measure her own behavior. She lamented that she couldn't use them to make sense of her ES© environment. Participants 2, 3, and 6 discussed knowledge that helped them in the ES©. Participant 6 listed his usual approaches to group work, sharing how things he learned through "Adaptive School techniques" and his dissertation helped him facilitate in an online environment. Participants 2 and 3 compared the dynamics in ES© to their work experiences and referred to literature that helped them understand the dynamics related to power and identity. Participants 4 and 5 mentioned personal experiences only, and did not describe knowledge they acquired through either reading or formal learning.

Openness—Willingness to Change

An openness or willingness to consider change appears to have some relationship to actual cognitive change, especially when that openness is a whole-hearted self-questioning. Participant 2 referred to such self-questioning, writing, "I will also look at ways I responded to others in order to check my interaction." Participant 3

responded similarly: “I am guessing that my perceptions aren’t even very accurate with those.”

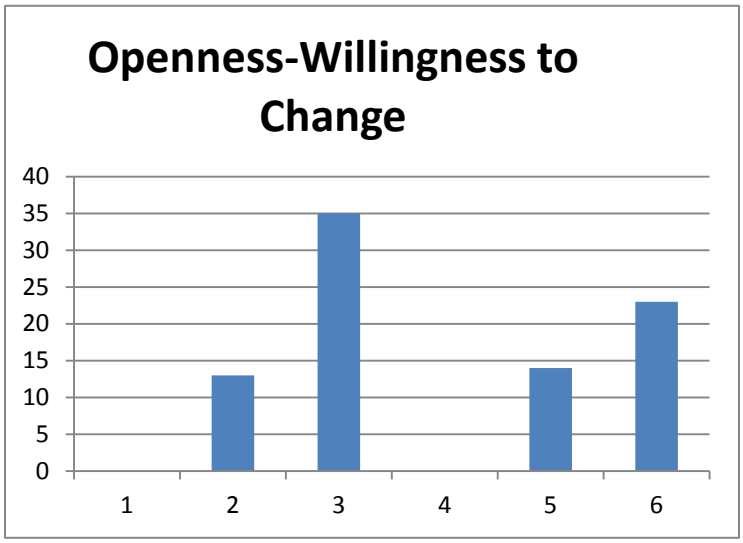

Figure 14. Openness or willingness to change: individual instances.

Both 2 and 3 also expressed their willingness to change their approach based upon their experiences. Participant 3 reflected on his previous tendency to show favoritism to those he believed could help him be most productive. He said, “I will reflect on this experience and be willing and able to give someone more of a chance to introduce themselves as a new acquaintance.” He also added, “I will apply my learnings in real life by being more patient and allowing more time to get to know people before I decide who thery are.” Participant 2 explained how she too was willing to take new approaches. She commented, “I realized that in order to get the tasks done, we all have to make some concessions. I decided to go with the flow and not push people on the issues.”

In contrast, participant 6 was not whole-hearted in his openness. Although he made statements that conveyed a willingness to self-question, these were often followed with a qualifying statement. For example, he described his self-questioning as a result of others’ negativity toward him.“I think I will experience some negative perception for that, and would invite suggestions on how to do that differently.” Yet many of his

expressions were qualified with a “but.” He excused, “I am trying to suspend judgment until it is completed, but I had to get this part of my frustration off my chest.” He further explained, “I want to keep an open mind, but as a person who lives as a minority on a daily basis, I find the manipulation contrived.” Once again participant 6 observed, “I am trying to be open minded, but it is very difficult as I am now certain that they are not my actual classmates.” These statements suggested that participant 6 was not as openminded as he wished to be.

The idea that change requires a whole-hearted or honest approach to openness is also found in the literature. For example, Dewey (1933) proposed that such rational thinking dispositions include open-mindedness, whole-heartedness, and responsibility. To Dewey open-mindedness meant a willingness to consider other perspectives and to accept that current beliefs might be wrong. By whole-heartedness and responsibility he meant the willingness to engage in the necessary concentrated thinking and to live with the consequences. I calculated Pearson’s r using the particpants’ number of instances coded for openness and the number of instances coded for reflection. There was a strong correlation ($r = .87$) between openness and reflection: the more reflective participants were, the more open they tended to be.

But that does not tell the entire story. Stanovich and West (2008a, 2008b) specifically tested whether open-mindedness and a need for cognition (what Dewey called whole-heartedness and responsibility) were related to overcoming biases. In natural (optimal) conditions, they found that actively open-minded thinking only weakly correlated with preference to one’s bias, and the need for cognition even more weakly—and only in some instances (Stanovich & West, 2008a). Much more important

to determining whether a person was open-minded was the content of the topic and the strength of one's belief toward it: if one holds a strong opinion on an emotionally charged topic, he is less likely to be open-minded on *that issue* than if he is ambivalent to it. A generally open-minded person may not be open-minded in all instances, and if one is relatively open-minded on a topic, it may be because he is not emotionally involved with it. This is a possible explanation for participant 6, who seemed to be both reflective and open, but qualified his openness and thus resisted change.

Reflection

For the purpose of this analysis, reflection was defined as *the participant indicates he or she is thinking about what has occurred and attempting to sort it out. The participant may be considering alternative ways to respond. Reflection may involve metacognition. The participant may also demonstrate a level of insight that goes beneath the surface to consider the underlying dynamics.* Four of the participants wrote numerous statements that would be considered reflective according to that definition. Two participants (1 & 4) offered few reflections, giving the impression that they were not fully engaged in an analysis of their learning.

Participants 2, 3, 5, and 6, were often reflective. They reflected on themselves, on the actions and motives of others, and on the ES© process. Participant 6 provided an example of metacognitive self-reflection, writing, "I do have these preconceptions. I don't like them, but I do." Participant 3 used the words "think" and "thought" at least 54 times as follows: "One thing I think I do is to size up a comment made by someone and then put it in context based on their education and experiences." Participant 5 provided an example of one participant reflecting on others' motives. She said, "I still want to

know why [participant] 1 feels she must have a quick, smart answer to everything. I also want to know why 1 feels it's OK to tell the rest of the group she is bored." Particpant 2 displayed her reflection on the ES© process when she stated, "The group seemed more cohesive tonight. I am not sure if this was due to the chaotic beginning or if people were affected by the pictures or the text."

Educational leaders propose that educators must be reflectve to improve teaching practice (York-Barr, Sommers, Ghere, & Montie, 2006). York-Barr et al. (2006) described reflective educators as 1) having a "sustained interest in learning;" 2) inquiring into their "underlying assumptions, biases, and values;" and 3) considering "issues of justice, equity, and morality" (p. 15). Stanovich and West (2008b) called the ability to hold heuristic responses at bay while alternatives are considered "cognitive decoupling" (p. 688). They explained that dramatic changes in organizing the meaning of data and one's experiences requires a careful contemplation of new data, a recall of what is known, mental representation of various conceptions, and consideration of alternative meanings. Completing these tasks requires efficient use of working memory. The more background knowledge one has on a topic—and the more information stored in patterns or "chunks"—helps facilitate maximum use of working memory (Bransford et al., 2000; Willingham, 2009).

Resistance

Resistance plays an important role in preventing change (Barnard, 1938; Dewey, 1933; Fairbanks et al., 2010; Heifetz, 1994; Kuhn, 1962; Mezirow, 1991; Quinn, 1996). Resistance can be both passive and active. Participant 4 gave some examples of passive resistance early on by leaving some questions blank and giving only short, unreflective

answers to others. Participant 6 displayed passive resistance by not submitting answers to the final reflection until being reminded to do so, and then his answers came at the last possible moment. He asked the instructor, “Will I be penalized if I choose not to respond to these questions?” In contrast, participant 1’s resistance was active. She continually denied that the ES© had any impact on her behavior or thinking, writing things such as, “Man, I really feel bad about this, but I have no reaction at all.” She stated that she learned nothing in the process and that it was a waste of her time. Participant 1 declared: “I do not feel like I have learned or gained anything.” She addressed her instructor and said, “[Instructor], I started this but cannot finish . . . I have about a million better uses for my time.”

Resistance and reflection appear to be opposite attitudes and have opposite impacts on the possibility of cognitive change. The more one is reflective, the less one is resistant. The relative number of participants’ instances of resistance and reflection are shown in Figure 15 (p.188). A Pearson’s correlation revealed a medium, inverse relationship (r = -66). Participant 6 served as an excellent example of the inverse relationship between reflection and resistance. He began the ES© being very reflective. After the first session he wrote, “I will try to control my responses and bring them back to a level where others can offer more suggestions and input.” However, after he learned that his own identity had been masked, he became very resistant. He wrote, “My strongest learning was not a positive one. I had many reservations and still do that this environment will be a successful learning one for me.”

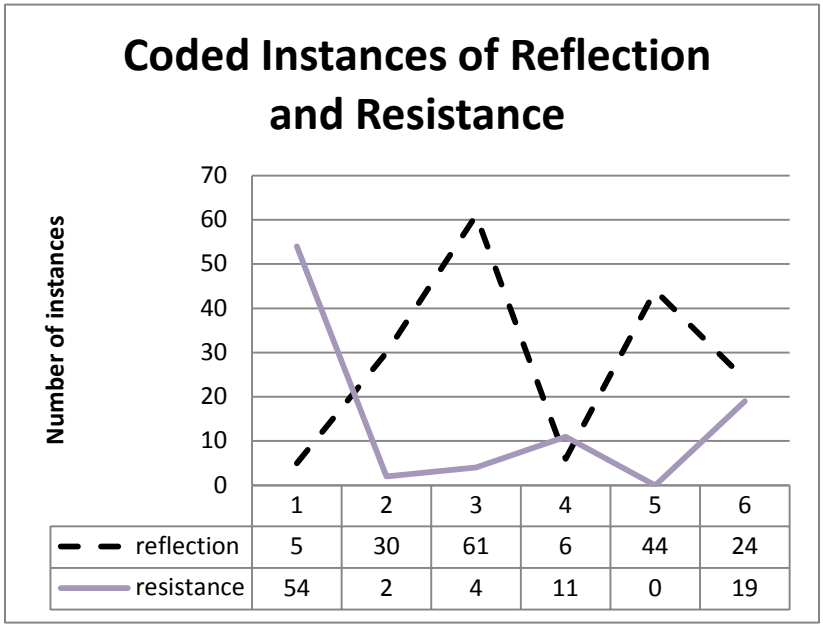

Figure 15. Reflection vs. resistance: individual comparisons.

Findings

Predicting educator cognitive change based upon an individual's behavior is problematic. To identify possible cases of cognitive change, I made the assumption that participants who displayed a higher percentage of conflict and emotion relative to their peers were more likely to undergo cognitive change than those who displayed a lower percentage. Using this method, participants 1, 2, and 4 were identified as most likely to undergo cognitive change, and participants 3, 5, and 6, least likely. These assumptions proved to be false. Participants 2 and 3 changed, while participants 1, 4, 5, and 6 did not. Additionally, participant 4, although identified as a likely candidate for cognitive change based on her behavior, already possessed a power with/to meaning perspective which did not necessitate a change. The results of the analysis indicate that there is

likely no relationship between the six participants' behaviors in the chat space and the potential for undergoing a cognitive change as a result of the experience.

The prediction that expressions of conflict and emotion in the chat space are related to cognitive conflict also appears to be unfounded. Participant 1 was caustic in the chat environment, yet in private reflections gave little or no evidence of cognitive conflict. Alternately, participant 6 displayed little conflict or emotion in the synchronous discussions, but revealed the most cognitive conflict among the participants in his reflections. Most people learn to practice restraint in their relationships with others, especially publicly, whereas others wear their hearts on their sleeves. Participant 1 indicated that her aggressive behavior in the chat space was typical of her behavior in the work environment and was unapologetic. The outward indicators used in this analysis were unreliable predictors of both cognitive conflict and change.

Among the coded factors, no single factor emerged as the primary influence affecting educator cognitive change, either positively or negatively. For example, all six participants displayed periods of confidence and frustration. Also, both those who changed cognitively and those who resisted change displayed strongly positive self-efficacy. Rather than attributing cognitive change to one, or some, key factors, it is likely that there may be an interrelated set of dynamic factors that underpin educator cognitive change.

There are factors outside of the ES© that likely play a part in supporting or inhibiting educator cognitive change. Such factors may include participants' previous experiences, work environments, or personal events. The two participants who resisted

change both referenced outside experiences that may have contributed. Participant 1 indicated she takes also a command-and-control approach to her leadership at work, because in her experience, “It’s not personal, it’s business.” Participant 6 indicated that his experience in the real world made him skeptical of the online environment. He stated, “I want to keep an open mind about this part of the experience but as a person who lives as a minority on a daily basis I find the manipulation contrived.”

While no single factor emerged as key to influencing educator cognitive change, several tendencies are suggested. First, the participants who began with a power with/to meaning perspective (4 & 5) had more coded incidents of confidence than those who began with a power over perspective, perhaps implying that one may be more confident when both educator development and one’s meaning perspective are aligned. Second, those who did not change their meaning perspective (1 & 6) in the intended direction of power with/to displayed more frustration and resistance than those who either changed (2 & 3), or did not need to change (4 & 5). Finally, the two participants who underwent cognitive change (2 & 3) displayed common patterns among the factors identified as likely to be associated with change according to the emergent themes and literature (see Figure 16, p. 191). Both had high instances of *joy/excitement, background knowledge, positive efficacy, openness to change,* and *reflection.* They also both displayed low *anger, annoyance, blaming, negative efficacy, and resistance.* The other four individual cases were inconsistent in those same categories, giving no indication of a pattern.

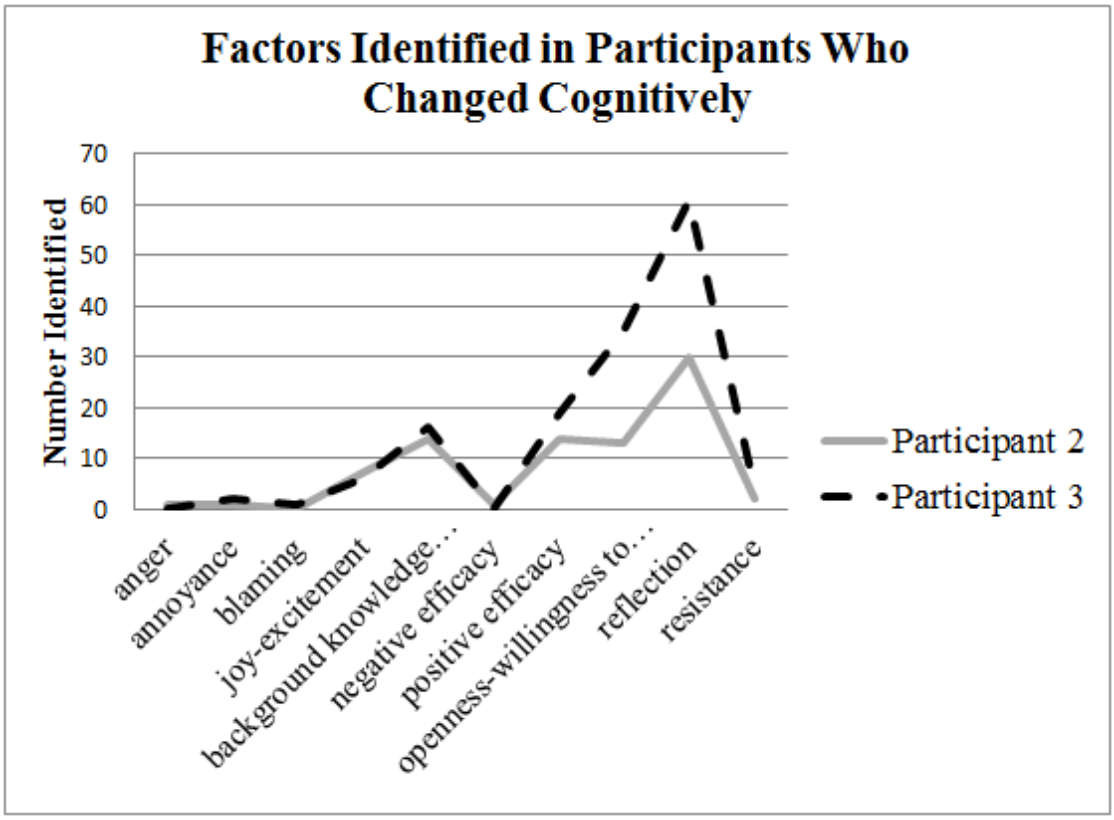

Figure 16. Factor comparisons between participants who changed.

CHAPTER FIVE:

CREATING AND APPLYING THE COGNITVE CHANGE MODEL—RESEARCH QUESTION TWO

The twofold purpose of this exploratory dissertation is: (1) to gain a transdisciplinary understanding of educator cognitive change, and (2) to use that understanding to develop a model of educator cognitive change. The following questions are answered to fulfill the dissertation purpose:

1. How might qualitative data be analyzed to capture observable phenomena associated with cognitive change?
2. How might an original model that incorporates education and neuroscience literature provide explanation for educator cognitive change?

This chapter answers the second research question by developing a model to illustrate the dynamics of educator cognitive change and then using that model to interpret individuals' change experiences. I first weave together the data analysis and literature from various disciplines to create a model that accounts for the lived experiences of the individual cases studied, together with theoretical, behavioral, and neural understandings. This is found in the section entitled "Creating a Model."

Later, I revisit the individual cases one at a time, walking through their qualitative data chronologically while using the model as a lens to understand the process of cognitive change as it unfolds. The model is used to identify possible reasons that cognitive change did or did not occur. This is found in the section entitled, "Applying the Model," The chapter is organized according to the following sections: 1) Creating a Model, and 2) Applying the Model.

Creating a Model

This section of the dissertation answers the second research question, “How might an original model that incorporates education and neuroscience literature provide explanation for educator cognitive change?” In creating this model, I wove together the qualitative data gathered from participants in an ES©, theories in the literature, and findings of research studies. The model is transdisciplinary because it uses a qualitative social science approach together with literature from various disciplines, to provide a full picture of educator cognitive change. Development of the model began with literature from both education and neuroscience.

Any cross-over communication between education and neuroscience is difficult because the two operate on different levels of complexity (Willingham & Lloyd, 2007). Those interested in such transdisciplinary work suggest that cognitive psychology lies in the overlap between education and neuroscience and can help provide a communication link (Blakemore & Frith, 2005; Szucs & Goswami, 2007; Willingham & Lloyd, 2007). Work by Evans (2003, 2008), Stanovich and West (2008a, 2008b), and Willingham (2009) provide cognitive psychology links between education and neuroscience on the topic of educator cognitive change.

This model of educator cognitive change concerns deep, personal change. Such change is difficult because it involves deeply held assumptions about reality, personal experiences, and emotionally held beliefs. It occurs within the mind as one realigns one’s thoughts to a new interpretation of facts, a different mental construct of reality, or a mental basis for new behavior or action. Such cognitive realignment becomes necessary when a conflict occurs. Conflict may arise when environmental conditions

change to the point that one's existing bases for sense making and behavior are no longer effective (Heifetz, 1994; Quinn, 1996), or when new information or anomalies are so numerous or powerful that they render the current mental construct as wrong (Cavanaugh & McGuire, 1989; Kuhn, 1962). Cognitive change then becomes necessary in order to make sense of our environment, provide a basis for successful navigation through life, and—in some cases—to survive.

Mezirow (1991) described such change as transformative, and proposed two levels at which this transformation occurs. One is the transformation of *meaning schemes*, which are particular beliefs or assumptions. Meaning schemes are transformed when they no longer operate to adequately inform action, and one takes on new understandings that prove more useful. The other, deeper level, involves a transformation of one's *meaning perspectives*, "a habitual orientation and expectation" (p. 44) that provides meaning to one's life and criteria for making evaluations. About these transformations Mezirow (1991) writes,

> *Learning through perspective transformation* is the fourth form that learning may take—becoming aware, through reflection and critique, of specific presuppositions upon which a distorted or incomplete meaning perspective is based and then transforming that perspective through a reorganization of meaning. This is the most significant kind of emancipatory learning. It begins when we encounter experiences, often in an emotionally charged situation, that fail to fit our expectations and consequently lack meaning for us, or we encounter an anomaly that cannot be given coherence either by learning within existing schemes or by learning new schemes. Illumination comes only through

> a redefinition of the problem. Redefinition in turn is achieved by critically reassessing the assumptions that support the current meaning scheme(s) in question. Such epochal transformations often are associated with a life crisis that impels us to redefine old ways of understanding. (p. 94)

The educator cognitive change model is described in the following sections: 1) Cognitive Change Prephase: A Meaning Perspective, 2) Cognitive Change Phase 1: Cognitive Conflict, 3) Cognitive Change Phase 2: Reorientation, 4) Cognitive Change Phase 3: Resolution, and 5) Visual Model of Educator Cognitive Change.

Cognitive Change Prephase: A Meaning Perspective

An educator's meaning perspective is a powerful factor in the cognitive change process. One's meaning perspective results from the interaction of that person's experiences and physiology (Lee, 2010), and is highly influenced by social interactions (Mezirow, 1991). This enculturation takes place over time and is the result of implicit and explicit learning. One's meaning perspective is the knowledge, beliefs, and attitudes with which they approach and interpret their environment. Mezirow (1991) referred to the various components that comprise a meaning perspective as meaning schemes. A person's conception of how the world operates is highly personal. Within any group, however, people share common, overlapping features due to sustained and negotiated interaction. Within a culture, these shared perspectives might be called a worldview. Kuhn (1962) described these common understandings and shared perspectives within the field of Science as a paradigm.

The educators in the Experiential Simulation (ES©) were involved in a graduate-level superintendency course. The ES© was designed to help participants self-identify

and challenge their conceptions of leadership, power, and identity. It involved negotiating a group leadership task in a leaderless, anonymous, and synchronous online chat environment, followed by private reflections. The data gathered through the synchronous chats and responses to reflective questions provide evidence of the participants' meaning schemes about leadership, power, and identity, and are organized in the following sub-sections: 1) A meaning perspective about leadership, 2) A meaning perspective about power, 3) A neurological basis for a meaning perspective, and 4) Setting the Stage for Educator Cognitive Change.

A meaning perspective about leadership. Through participation in society educators are deeply entrenched in the commonly held, traditional concept of leadership. This concept associates leadership with top-down authority and sees a leader as having traits or skills which dispose the leader to make decisions which others follow (Barnard, 1938; Pfeffer, 1977; Stogdill, 1950). This traditional view contrasts with contemporary views of leadership that promote shared authority, shared responsibility, democracy, and decision-making at the lowest possible level (Bass, 1990; Bass & Avolio, 1994; Wheatley, 1999). The ES© in the superintendency course was designed to create conditions which influence participants to move from a traditional view of leadership toward a more democratic one.

The meaning schemes held by the six study participants at the start of the ES© fell into three basic categories. Participant 1 described a leader as *one who influences others to accomplish a task*. She said, "As a leader I would play favorites with people who bought into my vision and supported me in getting things done." Participants 2 and 3 held similar initial conceptions of leadership. They described a leader as someone

who *makes decisions on behalf of a group* after gathering input from some or all stakeholders. For them, the reason for gathering input is primarily to gain support, or "buy-in." As participant 3 stated, "I consider the ideas of others, yet, I have been accused of already knowing what I want." A third meaning scheme of leadership was held by participants 4, 5, and 6. They described a leader as *one who creates an environment which enables inclusion of all group members in the decision-making process.* As participant 5 wrote, "My style is to attempt to find ways for group members to work together successfully and to develop strategies that honor everyone's voice."

A meaning perspective about power. The way one understands and uses power is closely aligned to one's view of leadership. Power is seen as influence and control, and is traditionally applied as "power over" (Brunner C. C., 2002, p. 695). Brunner used a literature-based, synthesized definition of power over as "power conceived as dominance, authority, control, influence, or power over others or things" (p. 696). An alternate conception of power is "power with/to" (Brunner C. C., 2002, p. 699), which Brunner synthesizes as "a capacity to accomplish certain social goals through cooperation among people or groups with various interests and concerns" (p.699). The removal of identity and the reflective questions in the ES© process were intended to support participants in a move toward a power with/to meaning perspective.

Participants 1, 2, 3, and 6 entered the ES© with a meaning scheme that can best be described as power over. Their conception of power was demonstrated by their words in the chat space, their written reflections, and the written reflections of others. For example, participant 1 used caustic language in the chat space that intimidated others and quieted opposition to her ideas. She responded to others with expressions

like, “Who cares?” and reflected, “Why should you listen to me? Because I took the ideas YOU ALL offered and made it a workable list. . . . Once they were with me on the vision, I could push it forward with less hassle.” Participant 3 observed that participant 1 “seems to take a ‘no prisoners’ approach to getting things done.” Others made similar comments.

Participants 4 and 5 both entered the experience conceiving of power as power with/to. Participant 4 described group decision making as, “Consensus on decisions, plenty of dialogue time, and an organized mode of deliberating so as to include all participants.”

The neurological basis for a meaning perspective. Understanding the neural processes involved in creating and regulating meaning perspectives provides a useful framework upon which to explain incidents of bias, resistance, and cognitive change. Cognitive psychologists provide a theoretical lens through which to interpret both the data and literature. The theoretical lens is based upon dual-process theories of cognitive function. Although there are several versions, Evans’ (2003, 2008) default-interventionist theory serves well.

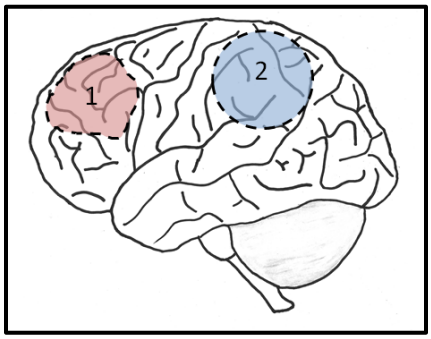

Figure 17. **Neural regions associated with System Two.**
1. dlPFC 2. parietal cortex

This theory suggests that there are two types of systems by which we process thought and make decisions. System Two (Figure 17, p. 198) refers to those processes that rely upon working memory (Willingham, 2009). They are slow, sequential, and capacity limited. This type of system is generally considered to be intentional, to exert

higher order control over more automatic processes, and to rely upon neural systems associated with executive processes such as the lateral prefrontal cortex (De Neys et al., 2008; Deppe et al., 2005b; Egner, 2009; Raz & Buhle, 2006). Stanovich and West (2008b) have proposed that System Two processes fall into two levels of rational thought: algorithmic and reflective.

System One (Figure 18, p. 199) refers to processes that are automatic and do not require working memory. System One processes are rapid, preconscious, and can supply content for conscious processing by System Two (Evans, 2008). System One is associated with neural regions such as the limbic system, amygdala, hippocampus, and ventromedial prefrontal cortex (Bechara & Damasio, 2005; Blakemore & Frith, 2005; Evans, 2003; Goel & Dolan, 2002; Summerfield et al., 2006). According to Toplak, Sorge, Benoit, West, and Stanovich (2010) System One processes result from

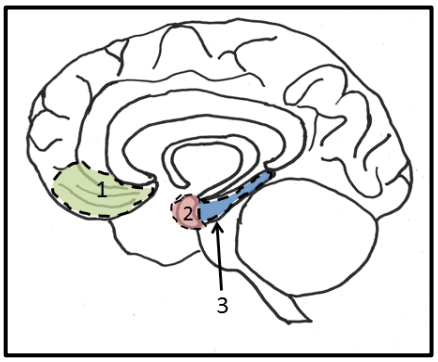

Figure 18. **Some System One neural regions.** 1. vmPFC 2. amygdala 3. hippocampus

> implicit and instrumental (goal oriented) learning, Darwinian modules, overlearned associations, and most importantly, processes of behavioral regulation by the emotions which respond automatically to stimuli to retrieve overlearned or automatically recalled associations. (p. 1283)

The term “systems” is used here to describe a network of neural regions that have been shown to act in concert with one another in either automatic or controlled ways. The term is not intended to imply that there is one automatic and one controlled

system, but that there are neural regions that are consistently activated during controlled tasks (System Two) and neural regions that are consistently activated during automatic tasks (System One). As neural regions associated with one system come online, those of the other region often become less active (Lieberman, 2010). In authentic contexts, the same neural regions of System Two may be active for a variety of controlled processes (Lieberman, 2010), or different neural regions associated with System Two may work parallel to one another (Egner, 2008).

Toplak et al., (2010) have described the brain as a “cognitve miser.” Whenever possible, it defaults to automatic processes that leave working memory free for other tasks. Accordingly the brain relies on System One processes to rapidly react to its surrounding, and it preferentially recruits existing, automatic memories and beliefs (Evans, 2008). The brain does so regardless of a person’s intelligence or ability for more reflective thought (Stanovich & West, 2008b), and regardless of whether one realizes that his understanding is inaccurate (De Neys et al., 2008). Reliance on a meaning perspective is especially important when working memory load is high (Kelley & Lavie, 2010; Willingham, 2009) or when time is pressing (Amodio et al., 2004; Evans, 2008).

What Mezirow (1991) described as meaning perspectives and meaning schemes are the result of these neural processes. Unless cued otherwise, people default to System One processes whenever possible (Stanovich & West, 2008b). The mind biases toward expected patterns (Bechara & Damasio, 2005; Deppe et al., 2005b; Evans, 2008; Goel & Dolan, 2002; Kuperberg, Lakshmanan, Caplan, & Holcomb, 2006) and is vulnerable to the effects of framing (De Martino et al., 2006; Deppe et al., 2005; Fugelsang &

Dunbar, 2005) resulting in decision-making and behaviors that are based more upon emotions (Bechara & Damasio, 2005) and previous experience than on rational thought (Amodio et al., 2004; Evans, 2008; Lieberman, 2010).

It is important to note that System Two and System One processes are not necessarily at odds. Intentional thought using System Two is supported by the patterns, perceptions, feelings, and memories automatically generated by System One processes enabling System Two to be more efficient. At the same time, System Two provides a way to justify or explain unconscious decisions and behaviors (Evans, 2008).

Since one's meaning perspectives and schemes are a default, automatic position, they often express themselves without conscious thought. Amodio et al., (2004) found that people often answered stereotypically regardless of their stated egalitarian beliefs when asked, under condition of time restraints, if a briefly viewed photo of a person with a gun was white or black. Similarly, Brunner (2002) found that power over and power with/to have "high fidelity" (p. 703) to one's actual performance as opposed to one's stated position. These findings support the common expression *actions speak louder than words*.

Participants 2 and 6 are examples of individuals whose *stated* beliefs reflected power with/to, but whose actions revealed a meaning scheme of power over. Participant 2 initially described her conception of power as power with/to. She wrote, "The most important things to consider in any decision-making process [are] understanding the issues and including stakeholders." However, upon reflection she realized that her actions in the workplace did not match her stated beliefs. She wrote after the second chat session,

> I consider the ideas of others, yet I have been accused of already knowing what I want. I am not sure what others think of me. I believe that people will think that I can be stubborn and keep at it until I get what I want.

Participant 2's recognition of the discrepancy between her beliefs and actions played a role in her eventual cognitive change.

Participant 6 believed that he too held a power with/to view, but his actions revealed his power over meaning perspective. In his very first written statement, 6 described what he believed to be most important in decision making, revealing his power with/to beliefs, "Establishing an agreed upon process (complete with ground rules for communication and collaborative norms), determining how decisions will be made, and agreeing on the common purpose of the group (complete with outcomes)." Participant 6 also described himself as an inclusive leader. He reflected, "I also want them to know that I am genuine in my desire to include those voices that are usually excluded rather than included. It has been a hallmark of the work that I do on a daily basis." Nevertheless, others described 6 as controlling: Participant 2 wrote, "1 and 6 were directive in responding during the chat room. 6 was commanding." After reviewing the first chat session transcripts, 6 conceded, "I think others need to know that I am not as controlling as the transcript communicates."

Setting the stage for educator cognitive change. The above neurological explanation suggests how an educator's meaning perspective exists, and how it biases learning and influences decision making. It does not explain why meaning perspectives are so hard to change. It's not that educators don't want to try new things, especially when the current methods are not satisfactory; it's just that it is very difficult for our

brains to get there. Dewey (1933) described it as a problem with people not being trained to be open minded and to engage in reflective thought. Others have blamed the tendency to follow heuristics over rational thought on an intelligence deficiency (Evans, 2003). But when it comes to decision making, Stanovich and West (2008b) found that the reason people follow automatic System One processes has little to do with cognitive ability or thinking dispositions.

Stanovich and West (2008b) created a "framework for individual difference in heuristics and biases tasks" (p. 687) which is useful for understanding processes that enhance or inhibit cognitive change. Their work is based on studies which examined a variety of biases—in particular, the degree to which cognitive ability and strength of prior opinion were associated with uncued situations of myside and one-side bias.

Stanovich and West (2008a) found that changing one's beliefs requires System Two processes. Although System One processes automatically predispose people to heuristic thinking and responses biased in favor of previous experience and beliefs, a second, rational system, System Two, can be engaged to provide reasoned responses that consider the data to make the best decision. In their framework, Stanovich and West (2008b) proposed that in order for a person to consider using rational processes rather than hueristic responses, several conditions are necessary. First, one must have the necessary "mindware" (p.687), or requisite background knowledge, to come to an alternative conclusion. Second, a person must detect the need to engage System Two cognitive resources and to inhibit the automatic response. Still, Stanovich and West (2008b) found that unless some cue leads people to engage System Two processes, they

default to System One processes and follow heuristic responses, *even if* they possess the necessary knowledge to come to an alternative solution.

Cognitive Change Phase 1: Cognitive Conflict

The brain needs a stimulus from the environment to alert it that the preferred mental operation is an inadequate response (Stanovich & West, 2008b). This "kick" (Cavanaugh & McGuire, 1994, p. 11), or "disorienting dilemma" (Mezirow, 1991), may come from a prompt to think critically, a conflict in the environment, or the commission of an error. Such a kick may lead to cognitive conflict. To do so, a conflict must first be detected, or cued, and then disorientation must ensue (Stanovich & West, 2008b). These topics are addressed in the following sub-sections: 1) A cue, 2) Disorientation, and 3) Symptions of cognitive conflict.

A cue. Anomalies, errors, and competing stimuli or responses can all cue conflict and a need to engage System Two resources. An anomaly is something that is unexpected. Each study participant expressed moments of surprise, especially in regard to some aspect of the pseudo identities. Only participants 2 and 3 were surprised by aspects related to "power." Both surprised by the lack of colleague response to their "excellent suggestions" (participant 2) during chat session one. For participants 2 and 3 this cue inspired further reflection. Participant 2 mused, "I believe that to others in the group I was of no consequence. I was not acknowledged for my input at all." Participant 3 added, " I think because of the positions I have held and the opportunities I have had to speak to captive audiences that it was an adjustment for me to not have quicker responses from my classmates."

Neurscience studies show that the anterior cingulate cortex (ACC) responds to environmental cues and signals a need for cognitive control (De Neys et al., 2008; Egner 2007, 2009; Gehring & Fenscik, 2001). The dorsal portion of the ACC (dACC) is activated during conflict (Egner et al., 2007) and engages System Two resources such as the dlPFC to inhibit automatic processes (Amodio, Master, Yee, & Taylor, 2007), to increase attentional control (Egner & Hirsch, 2005; Mohanty et al., 2007), and to engage working memory and reasoned thinking (Deppe et al., 2005a; Goel & Dolan, 2004).

Errors committed by oneself or others cue a need for cognitive control (De Neys et al., 2008; Rubia et al., 2003). Participant 4 described the personal conflict she experienced as the result of errors she made while picturing other participants' identities. After seeing the pseudo photos, 4 wrote, "I am baffled. Most of the assumptions I made during the first chat do not match certain individuals in the group." Participant 6 not only noticed his errors in behavior, but also described remorse over them. He noticed, "There was very clear feedback that some already had strong opposition to what I was doing." He apologized, "I tried to establish order in the conversation as a matter of self-preservation. . . . I think this created an undue tension for people, and I need to apologize for this."

The neural region known as the rostral anterior cingulate cortex (rACC) is found to be active when errors are either made or perceived in oneself and others (De Neys et al., 2008; Mansouri et al., 2009; Rubia et al., 2003). Some research has found that the rACC is activated along with the vmPFC, amygdala, and other limbic regions (see Figure 19, p. 206) associated with automatic responses when biases are followed (Goel

& Dolan, 2002; Margulies et al., 2007). Other research has found that rACC activity coincides with a decrease in the amygdala and limbic system suggesting it is associated with emotional regulation (Egner et al., 2007; Mohanty, et al., 2007). It seems that the rACC monitors errors, or potential errors, in judment and signals a need for cognitive control to inhibit emotional processing (Egner et al., 2007; Mohanty et al., 2007) and to recruit the executive function in the PFC (De Neys et al., 2008).

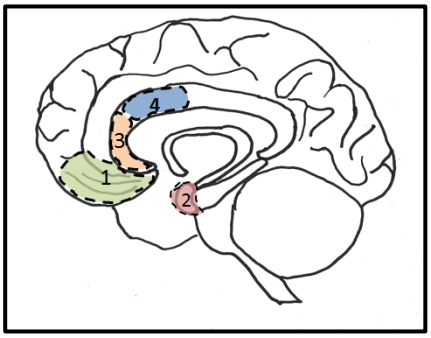

Figure 19. **Regions of the cingulate cortex and System One.** 1. vmPFC 2. Amygdala 3. rACC 4. dACC

Cue detection does not always result in cognitive conflict. One's first response to a cue is to try to explain it within one's existing meaning perspective. Sometimes that explanation proves satisfactory. Two participants (4 & 5) experienced little conflict because they already possessed the necessary knowledge or experiences to resolve it. In the first chat session, when cued about a discrepency between her beliefs about power (power with/to) and her actions (power over), participant 4 applied her previous experiences to resolve any conflict. She wrote, "The group reacted to me much more positively when I was less assertive. That's usually the case. I'm received more favorably if I display collaborative, respectful, and less assertive behaviors." Participant 5 too demonstrated ready solutions from her existing meaning perspective to resolve any negative cues. She wrote,

> I played the role of "encourager." Instead of saying, "No, but…" I was saying, "Yes, and…" Several of my comments began with an agreement of a previous

statement and a continuation of that subject. There were times when I attempted to summarize where the group had been to help us move forward.

Other times a person ignores the cue or willingly favors a meaning perspective solution that is inadequate. Negative feedback from others cued participant 1 that her power over tactics were not productive. Yet she did not accept that her meaning perspective required adjustment. She admitted, “I know, I know… I really have no intention of finding consensus. Shame on me.” Rather than seeking a novel approach, she blamed others’ incompetence: “Too many people abdicate their personal creativity, energy and power by being passive, hesitant, people pleasers or followers. So I step in. Many times, as in this session, no one seems to mind.”

Research agrees that detecting a cue does not always result in cognitive conflict. Sometimes the cue does not rise to the level of consicousness (De Neys et al., 2008). Other times a cue signals a need for cognitive control, but a person may be biased toward one’s existing meaning perspective. Persons who display this kind of bias recruit the ventromedial prefrontal cortex (vmPFC) rather than the lateral prefrontal cortex (lPFC) associated with System Two, as expected (Deppe, 2005a; Lieberman, 2010). One type of biased decision is when a person *willingly* favors his or her meaning perspective in the face of contradictory evidence (Stanovich & West, 2008b). Studies show that the vmPFC is activated when people respond in favor of preferenced (myside) bias despite the presence of conflicting data (Westen et al., 2006). But if a person’s convictions are especially strong, the rACC signal is weak or nonexistant (Inzlicht et al., 2009) making reasoned decision-making unlikely.

Often, continued cues suggest that efforts to solve the problem within one's existing meaning perspective are inadequate and that a novel explanation is necessary. When cued, participant 6 attempted to implement a previously learned solution. He wrote, "I use concensus building tactics and Adaptive School techniques that I have learned over the years of facilitation I have been a part of." Still, continued negative feedback persuaded him that a new approach was needed: "There was very clear feedback that some already had strong opposition to what I was doing, and I will need to take that into consideration as I think about what direction I will take during the second section of this work."

Disorientation. Disorientation occurs when one detects an environmental cue that the automatic response is inadequate but the person lacks the capacity to devise a better one. All except participant 1 described feeling some disorientation. Participant 6, for example, received feedback from others and from his own review of the chat room transcripts that he displayed power over actions, despite his power with/to beliefs. He expressed the resulting cognitive conflict: "I have never found a learning process to be as painful, purposeless, and debilitating as I did the first hours of this." Unable to resolve the conflict, disorientation ensued. He complained,

> I am not really understanding the purpose of this exercise or appreciating any learning that is resulting. I am, quite honestly, feeling VERY frustrated with this process, and I am struggling to see how this exercise ties into the skill set that will be required of me as a superintendent.

The literature states that change involves a period of inner conflict. New data or anomalies occur that are inconsistent with what one expects (Blakemore & Frith, 2005;

Kuhn, 1962). A growing misalignment between one's meaning perspective and reality indicates errors, and the result is a feeling of disorientation (Heifetz, 1994; Quinn, 1996; Weick & Quinn, 1999). This disorientation may be associated with the ACC signal that cognitive control is needed due to discrepant data. The result is a mental struggle between a reasoned, controlled response that agrees with the data but contrasts with an automatic response supported by physiological changes (feelings).

The literature suggests several sources for this disorientation, including 1) an awareness of one's inability to make sense of the information (Weick, 1993); 2) a feeling of inner, emotional conflict (Bechara & Damasio, 2005); 3) the loss of self-efficacy (Bandura, 1993); and 4) cognitive overload (Bannert, 2002; Kelley & Lavie, 2010).

Loss of sense making. Weick (1993) described sense making as the process of using past experiences to create narratives of meaning for present circumstances. Loss of sense making occurs when there are insufficient memories or background knowledge to create meaning. Several participants described such experiences. Participant 3 was unable to figure out how to make his points noticed in the first chat session because his usual tools for doing so were not present. He explained,

> I did have some feelings of wanting to exert greater presence but could not really think of ways to do it when limited with only keying in thoughts. In a setting where there are face to face opportunities other communication modes might come into play such as proximity, projection, articulation, and physical gesturing. None of these can be used in this type of communication.

Participant 6 described his own struggles with sense making: “Tough! When rules are absent, there is little to go on. People’s frustrations were high. The ambiguity was great. The sense of helplessness seemed strong. I took ownership of a process to help ease my own frustration.”

Sense making relies on automatic and reasoned solutions supplied by one’s meaning perspective or schemes. Devising a solution to cognitive conflict requires System Two processes, but System Two proccesses rely on a store of memories and emotions (Bechara & Damasio, 2005; Evans, 2003, 2008; Lieberman, 2010). Insufficient memories result in a lack of adequate knowledge and skills, or “mindware” (Stanovich & West, 2008b, p. 687). This lack of background knowledge leaves a vacuum in which the person is unable to make sense of the situation (Weick, 1993).

Emotional conflict. An inner, emotional conflict can also cause disorientation. Participant 5 wrote how the inability to make personal connections with others created a feeling of isolation. “I don’t think others want to know anything about me. I felt invisible last night and did not feel a connection to anyone in the group.” Participants 2 and 3 both described feelings of disorientation when they realized they had been guilty of stereotyping based on the pseudo photos. Participant 2 explained, “I actually could not respond on the computer for a moment. It wasn’t shock so much as needing time to think about what I said and how I said it in previous sessions.” Participant 3 said it this way: “I was connecting the inputs and the pseudo-pictures as one entity, and when it changed it was a strange feeling. It was a feeling of almost having to get reacquainted.”

When an error is detected, the rACC is activated. The automatic response is supported by emotional processing neural mechanisms such as the amygdala and

ventromedial prefrontal cortex. These neural mechanisms trigger physiological changes that make the automatic response *feel* right (Bechara & Damasio, 2005; Mohanty et al., 2007; Rubia et al., 2003). Other responses *feel* wrong. The rACC signals that an error has occurred (Chiao et al., 2009; Van Schie et al., 2004), and that an analytical override is needed. However, if the person lacks the required knowledge (Stanovich & West, 2008b) or other internal capacities for cognitive change to occur, the conflict will be unresolved.

Loss of efficacy. A loss of self-efficacy contributes to the disorientation. Both participants 2 and 5 describe disorientation as a result of low efficacy. Participant 2 described her confusion over her peers indifference to her contributions, saying, "I thought these were excellent suggestions that were not given credence until mentioned by others. I sat back for a while and read responses from others wondering if my absence would be noticed. It wasn't." Participant 5 wondered whether her inability to make meaningful contributions would transfer to her real life. "This observation makes me nervous about working somewhere new," she wrote. "Would I be invisible like Monday night? Would I be ineffective like Monday night?"

Bandura (1993) described self-efficacy as "people's beliefs about their capabilities to exercise control over their own level of functioning and over events that affect their lives" (p. 118). He explained how those with strong self-efficacy are willing to engage in challenging mental activities, and view error as a means to grow and an indication that more effort is required. They see themselves in control of the change process and are willing to endure disequlibrium while holding to an expectation of future reward for their efforts. Those with weak self-efficacy consider error an

indication of incompetence and avoid challenging situations. They feel out of control in the face of change, resaulting in anxiety and stress.

Cognitive overload. People find it difficult to make sense of their situation when the cognitive load is high. Fifteen people trying to solve an ambiguous problem exceeded the working memory capacity of the ES© participants. Frustration due to cognitive overload was frequently mentioned during the chat sessions. Participant 2 wrote, “I am having difficulty following the different conversations. I am suggesting we find some order to what can be chaos.” Participant 4 chatted, “This takes a lot of concentration—slow!” In his reflection, participant 3 described the experience this way: “I did find myself thinking hard most of the time but experiencing periods when I just had to check out for a minute or two and let my mind rest. Fatigue certainly set in periodically.”

Working memory is needed to perceive, attend to, and coordinate environmental input (Faw, 2002). Cognitive overload can occur when the inputs are too many or too complicated (Bannert, 2002; Kelley & Lavie, 2010), or when the individual has insufficient background knowledge readily available to automatically process needed information (Bannert, 2002; Willingham, 2009). A cognitive overload descreases one’s ability to shut out distractors, attend to the target stimuli, and select a reasoned response—resulting in a sense of disorientation and reliance on automatic reactions (Kelley & Lavie, 2010).

Symptoms of cognitive conflict. Cognitive conflict is evidenced by negative emotional responses. All participants displayed examples of negative emotions ranging from annoyance to anger, due to conflict or disorientation. Participant 4 described her

frustration in the chat environment: “The larger group chat is frustrating since I feel that many times I’m not heard.” Similarly, participant 5 stated, “The session was chaotic, insipid and generally felt like a waste of time.” Participant 2 expressed her rising anger after the first chat session when she wrote, “Initially I was satisfied with the role I played during the session. Then I became angry and didn’t ‘play’ at all.” Participant 1 was the most expressive after the first chat session, declaring, “I might punch 6 right in the face. So far I think he is a self-righteous pseudo-intellectual.”

Cognitive Change Phase 2: Reorientation

Reorientation is the mental process of resolving cognitive conflict using a reasoned response rather than an automatic or heuristic one. Seeking reorientation is one’s natural response to feelings of disorientation. Reorientation involves 1) engagement of controlled resources for a careful contemplation of new data; 2) a recall of what is previously known; 3) mental representation of various conceptions; and 4) the consideration of alternative meanings. For reorientation to occur, a person must have the necessary amount of knowledge, certain internal capacities, and supportive external conditions. These are addressed in the following sub-sections: 1) Necessary knowledge, 2) Internal capacities, and 3)External capacities.

Necessary knowledge. The study participants in the superintendency ES© referred to knowledge that they either acquired, or applied in novel ways in order to make sense of their experiences. As reported previously, participants 4 and 5 already possessed the necessary knowledge to resolve the conflicts they experienced.

Participants 2 and 3 discovered that their current knowledge was insufficient on its own. As 3 wrote, “I feel limited because I can’t put forth what I consider to be some

of my strengths and assets because you can't channel them through the internet!" However, over the course of the ES©, both 2 and 3 gained and applied new information to help them grow. They compared the dynamics of the ES© to their work experiences and referred to course readings that helped them gain a better understanding of power and leadership. Participant 2 wrote,

> The articles we read last week about giving orders and power really stuck with me. I heard myself saying to the group, the decisions that we make about the work that needs to be done should be dictated by the situation and not by my role.

Through use of a metaphor, participant 2 applied previous knowledge in novel ways.

> The role of a principal and a superintendent is one like an air traffic controller where the inputs that you have to deal with never end. The diversity of the tasks is incredible and you have to be ready to roll with the punches. . . . I think it also related to the importance of a superintendent being able to get along with all people and to not pass judgment on others prematurely.

Both participants 2 and 3 used their new understandings to help them undergo cognitive change.

In their framework, Stanovich and West (2008b) found that a person must have the "necessary mindware" (p. 686) in order to solve problems of one-side and myside bias rationally rather than heuristically. Insufficient knowledge or understanding, known as a "mindware gap" (Stanovich & West, 2008b, p. 686), results in heuristic or biased responses. Theorists and researchers have long held that a certain level of knowledge and skills is necessary for cognitive changes to occur. Paradigm-altering

discoveries require expert knowledge from those immersed in a field, who can use new data to piece together and make sense of what appears to be discrepant information (Kuhn, 1962; Weisberg, 1999). Within education, Yoon et al. (2007) found that supporting changes in teaching practices required a significant depth of understanding. In a synthesis of studies, they found that it required at least 49 hours of job-embedded, intensive training to gain the knowledge needed to adopt a new instructional approach in mathematics.

Participants 1, 2, 3, and 6 all gave evidence of mindware gaps, but only 2 and 3 were able to overcome the tendency to follow previous conclusions, and come to a new understanding. Laying down a new set of memories, emotions, and knowledge that can be automatically used to make sense of one's experience is necessary (Mezirow et al., 2009; Weick, 1993; Weick & Quinn, 1999) but insufficient for reorientation. The process of reorientation is difficult work. Attending to anomalies is problematic for the brain, as is recalling, applying, and gaining understanding. These processes require working memory and effortful reasoning. This reasoning combines newly encountered data with that supplied by automatic systems and considers it in working memory (Evans, 2008; Weisberg, 1999). As a cognitive miser the brain finds it easier to ignore the anomalies than to load working memory, and if working memory is already full, then it has no choice but to follow a System One response (Stanovich & West, 2008b). Engaging System Two resources in times of cognitive conflict means that more attentional resources are required, that conflicting messages from System One processes must be held at bay, and that energy must be devoted to preserving self-efficacy by justifying or articulating a response. Automatic System One processes provide

confidence in navigating one's environment. Not relying on that system requires one to endure a period of uncertainty until new memories and procedures become automated.

Internal capacities. The literature about cognitive change refers to certain inherent qualities about an individual which may encourage cognitive change. I refer to those qualities here as a person's internal capacities. Such qualities include openness (Dewey, 1933), reflection (York-Barr et al., 2006), and self-efficacy (Bandura, 1993). In addition to these three, Stanovich and West (2008b) added a quality they call "cognitive decoupling" (p. 688), which is the ability to hold "a prepotent response in abeyance" (p. 690) while resolving a cognitive conflict. The qualities of openness, reflection, and self-efficacy can be observed in the behaviors and reflections of the participants. The last, cognitive decoupling, can only be inferred by behaviors and perhaps correlated with tests of fluid intelligence (Stanovich & West, 2008b), and so cannot be noted in the qualitative data that is a part of this study.

Openness—willingness to change. Three of the participants (2, 3, and 5) provided written evidence of an openness to new learning and experiences and/or a willingness to self-question, consider alternatives, or change. Participants 1 and 4 did not. In keeping with the inverse correlation (r= -49) between resistance to change and openness, participants 1 and 4 demonstrated resistance. Participant 6 is a curious case, because he showed signs of both openness and resistance.

Participants 1, 2, and 3 provided support for the notion that openness is an important internal capacity needed for change. Participant 1 demonstrated no openness, only strong resistance, and did not undergo cognitive change. She indicated at least 54

times her unwillingness to engage in the ES© process or self-questioning as typified in the following statements:

> Why did I have to waste my time with a bunch of bozos on a topic I could care less about? Where was the real learning environment here? . . . I was irritated beyond measure. Get on with it! Stimulate me intellectually, please! So I offered and demonstrated and did it myself. Here! Done! Enough already.

Participants 2 and 3 did undergo cognitive change. They also gave evidence of openness to learning and a willingness to question themselves, as well as to take on alternative approaches. Participant 2 described her openness to the ES© process: "I am really excited now. This is better than a murder mystery ride on the Orient Express." Participant 3 illustrated a willingness to question himself when he wrote, "Even though I find myself with impressions of some of the people, I question whether they are accurate or not and am not sure how to attach myself to them." He went on to explain a willingness to change:

> Writing the responses to these questions has caused me to think in some new ways about the concept of 'openness.' It may have an impact on me to reach out more to others with an opinion that might be of an underrepresented group.

Participant 6, on the other hand, demonstrates the complexity of "openness": People are not simply *open* or *not open.* Participant 6 revealed himself as a generally open-minded person, and open to the ES© process. He wrote, "I'm trying to remain positive about this whole process." He is willing to question his approach and ideas. "I do have these preconceptions. I don't like that I have them, but I do." He also indicates a willingness to change as evidenced in this statement:

> There was very clear feedback that some already had strong opposition to what I was doing, and I will need to take that into consideration as I think about what direction I will take during the second section of the work.

Despite his openness, participant 6 did not change. He also gave evidence of resistance. Regarding the ES© process he wrote, "I again am feeling manipulated by the images. I am starting to build a cynical attitude because I am seeing this as a 'forced' activity rather than a genuine one."

Based on the literature, participant 6's inconsistency is not surprising. Dewey (1933) discussed the idea of open-mindedness as part of a larger concept he called rational thinking dispositions. Such dispositions also include whole-heartedness and responsibility, being willing to engage in concentrated thinking, and living with the consequences. Participant 6 may be open-minded in general, but he was not whole-hearted in this instance. Instead, he qualified his openness: "I am trying to suspend judgment until it is completed, but I had to get this part of my frustration off my chest." He also explained, "I am trying to be open minded, but it is very difficult as I am now certain that they are not my actual classmates."

Dewey's (1933) conclusions and participant 6's conflicts are consistent with Stanovich and West's (2008a; 2008b) findings. They found that in cases where individuals have strong opinions, especially on emotionally charged topics, open-mindedness, intelligence, and a need for cognition are only weakly correlated with overcoming bias, if at all. Of more importance is the strength of the individual's belief or opinion (Stanovich & West, 2008a). Participant 6 realized he was not willing to be open-minded in this situation. "I want to keep an open mind about this part of the

experience, but as a person who lives as a minority on a daily basis, I find the manipulation contrived; it makes me angry to respond to something fictitious."

Variance in open-mindedness is supported by neuroscience studies on the effects of bias and framing. The brain defaults to neural mechanisms associated with System One processes when triggered by a variety of conditions, including partisanship (Westen et al., 2006), preferred consumer brands (Deppe et al., 2005a: 2005b), religious convictions (Inzlicht et al., 2009), and emotions (Bechara & Damasio, 2005). This preferential processing occurs despite cues that System Two processes should be engaged (De Neys & Franssens, 2009) and despite the presence of conflicting evidence (Westen et al., 2006). Participant 6's description supports the conclusion that certain experiences triggered an emotional response, leading him to preference existing power over solutions despite evidence of conflict with his stated beliefs—thus resulting in frustration and anger. Clearly, open-mindedness in general is insufficient to enable cognitive change.

Reflection. Reflection is the process of pausing to reassess actions, presuppostions, and decisions (Mezirow, 1991). Much has been written about the importance of reflection for fostering tranformative learning in meaning perspectives for adults in general (Mezirow, 1991), and for educators in particular (York-Barr et al., 2006). York-Barr et al. identify openness as an important element in an educator's reflective practice. Indeed, among the six participants in this study, there was a strong correlation ($r = .87$) between reflection and openness.

All participants gave evidence of reflection. Those that experienced a cognitive change in conceptions of power and leadership, or who already exhibited power with/to

and shared leadership when the ES© began, were more reflective than those who held on to a power over or consolidated leadership view. Additionally, participants who were more reflective also tended to be less resistant (r = -66).

Of greater interest than the quantity of reflections, however, is the quality of an individual's reflections. Mezirow (1991) explained that for meaning perspectives to be transformed *critical reflection* must occur. Critical reflection involves questioning the assumptions behind one's received knowledge (epistemic distortions), sociocultural beliefs and practices (socio-cultural distortions), and learned anxieties (psychic distortions), and is distinguishable from non-transformational reflections involving enlightenment on how we understand and act.

Every participant demonstrated both non-critical and critical reflection. According to Mezirow (1991), critical reflection is a necessary step in transforming meaning perspectives, resulting in cognitive change. Despite their critical reflections, not every participant changed.

Participant 1 had few reflections compared to incidents of resistence (a 1:10 ratio). Nevertheless, two of her five reflections, or 40%, were critical reflections, indicating the ability to question her assumptions. She criticized her own beliefs about others and her behavior when she wrote, "I was doing what I did not want people to do about me: assume I am what I say." In her second-to-last set of reflection questions, participant 1 wrote that the group worked well together to accomplish the task. This realization was in contrast to her previous assertions that most others willingly abdicated their power to one leader to accomplish a task. When asked *what surprised*

you most about this revelation, participant 1 responded, “That I saw us as working together.”

Participant 2 reflected critically, and changed her understanding of power and leadership, as well. After session two, she assumed that her improved influence in the group was due to her communication abilities. However, after participant 2—a black woman—learned she had been falsely portrayed as a white woman to her classmates, she critically reflected on her previous interpretation of her experience. She questioned, “I do know that people reacted differently to me during the second session, and now I am not sure if it was a result of my picture or a change of heart.”

Participant 3’s critical reflections provide insight into his mental journey, as he too experienced a change in his power and leadership meaning perspectives. After session one, 3 questioned his own and other’s ideas of inclusiveness. He wrote,

> One thing I was surprised about was our group’s discussion near the end about ‘inclusiveness.’ That one seemed like a mystery to me. It seemed as though some thought that not everyone had an equal opportunity to offer input. I find that unusual since all of us have access to our own keyboard and are able to offer input without immediate fear of what was written. I think if people weren’t offering input, that is their problem not the group’s.

As his experiences deepened, participant 3 began to question his previous assumptions about inclusiveness being self-perceived:

> I think I enjoy a response from my inputs more than I thought I did. As indicated above, it felt reinforcing when someone would respond back to one of my previous comments. I think I felt some frustration periodically when there didn’t

> seem to be any feedback coming back.

Later, he learned that he had been portrayed to the group as an African American male, though he is white. He then questioned his previous assumptions about why his comments were ignored. He reflected,

> I attributed that [lack of feedback] to the fact that everyone else was inputting data and thinking the same way that I was, and therefore I shouldn't worry about or think about the fact that no one seems to be listening to me. I would be very disappointed to learn that because I was represented as an African American male that I would have received less credibility and would be taken less seriously than if I were represented as a white male.

Participant 3 described what he learned through critical reflection: "Most importantly, I think it was a great exercise in how not to jump to conclusions and give people a chance."

Though 4's and 5's meaning perspectives were not challenged during the ES©, both participants shared evidence of critical reflection. Participant 4 came off as negative and pushy in the first chat session, but after critical examination, she improved her approach. She wrote, "By the last session I felt self-confident enough to be myself with the group and brush off negative comments." Participant 5, a white woman, was portrayed as a white, older male. She reflected critically on the possible effect her pseudo identity had on her experience:

> Usually I make more personal or relational connections when working in a group. I do not feel those connections so far with this group, and I attribute that to the fact that the other participants think I'm a white, older male who is

> wearing a suit and a tie. This guy seems more formal and proper at first instead of friendly and open.

Participant 6 displayed critical reflection, but it shifted from criticism of his own perspectives and behaviors to those of others. Early on, he was highly critical of his leadership tactics. He stated, “I think this created an undue tension for people, and I need to apologize for this.” He continued,

> There are parts of my personality that I need to monitor and watch as I participate in a group as a member and/or facilitator. I also need to be mindful of the inclusion people are feeling as we do our work together.

Participant 6’s criticism shifted at the end of the experience from himself to the ES© process:

> If this is indeed not the class with whom I am studying, I will be angry. Angry that I have forged potentially destructive perceptions [based upon] interactions, and relationships with persons who have been manipulated by the same process I was.

Neural activation during reflection varies depending on whether the reflection recalls well-learned experiences or is a critical re-examination of one’s previous position. Reflection evoking well-learned schema activates automatic processes in neural regions such as the ventromedial prefrontal cortex, amygdala, lateral temporal cortex, and lower precuneus/posterior cingulate cortex (Lieberman, 2010). Critical reflection, however, requires self-control to inhibit the prepotent response, control one’s evaluation, and consider change in one’s attitude. These latter behaviors are associated with neural activity in System Two mechanisms such as the left and right ventrolateral

prefrontal cortex, the dorsolateral prefrontal cortex, the dorsal ACC, and the supplementary motor area (Lieberman, 2010).

Cognitive Decoupling: Stanovich and West (2008b) noted that maintaining a mental state of openness and reflection requires something they name "cognitive decoupling" (p. 688). They describe cognitive decoupling as supressing the natural tendency to favor a heuristic response, while sustaining inhibition and concentration in the face of cognitive conflict, to allow slower (analytic) System Two processes to weigh in. Stanovich and West (2008b) explained that cognitive decoupling is needed for one to consider sustained "representations from the world so that cognitive simulations can be run which test the outcomes of imaginary actions" (p. 688). They suggested that cognitive decoupling may be associated with measures of fluid intelligence (Stanovich & West, 2008b). This qualitative analysis did not provide data to test this assertion, but I include it in this framework for two reasons: First, the concept of cognitive decoupling is consistent with neurological studies of framing effects and biases. Second, cognitive decoupling has been shown to be an important aspect of rational thought that may be associated with the reflective mind, and measureable using tools such as the cognitive reflective test (Toplak et al., 2010; Toplak, West, & Stanovich, 2011).

Self-Efficacy. Sustained cognitive conflict and an openness to consider whether current beliefs are wrong require strong self-efficacy. Bandura (1993) described self-efficacy as "people's beliefs about their capabilities to exercise control over their own level of functioning and over events that affect their lives" (p. 118). One might expect those with strong efficacy to be more likely to undergo a meaning perspective change than those with a weak or negative efficacy, but on the surface that does not appear to

be the case. There are, however, some interesting observations in support of the notion that self-efficacy plays a role in understanding educator cognitive change.

Participant 1 lacks sufficient efficacy to question and change her conceptions of power and leadership; instead she channels her energies toward preserving a sense of efficacy. On the surface, participant 1 projected a strong sense of self-efficacy, yet she also persisted in her existing meaning perspectives, despite evidence from fellow participants that her approach was unwelcome. She reflected,

> No, that's about it. People tend to love me or hate me. I think most people who get to know my heart rather than just my work character like me. If it's all work, forget it. I am very powerful and I don't share my toys.

Participant 1's strong efficacy provided the will to maintain her meaning perspective in the face of opposition, because she believed that she would be proved right in the end. In her final reflection she noted,

> I would have done it all myself and saved everyone else from the drudgery. I would have been thanked profusely as everyone else has something more important to do for the welfare of the children in our district. I may have convened the group for feedback/corrections, just to be politically correct, but I would have entertained little input.

The strong sense of efficacy participant 1 projected may have been intended to mask an inner doubt. This interpretation is supported by Bandura's (1993) assertion that "social comparison influences" (p. 121) can strengthen or weaken one's sense of efficacy. A number of participant 1's statements indicate a possibility that she struggled to preserve her self-efficacy by spinning a narration of events that built herself up at the

expense of her classmates. She asserted, “Too many people abdicate their personal creativity, energy, and power by being passive, hesitant, people pleasers, or followers. So I step in.” She claimed superiority when she said, “I took the ideas YOU ALL offered and made it a workable list.” Participant 1 even referred to her classmates as “a bunch of bozos.”

If participant 1’s statements were indeed meant to mask an inner lack of efficacy, that lack of efficacy may have been a factor in her inability to complete a cognitive change. When cued that her meaning perspective was faulty, she did not believe she had the ability to change; therefore, her energies went into convincing herself and others that she was proficient. This approach led her to a defensive stance in the chat spaces and reflections.

Participants 2 and 3 both completed a cognitive change. Likewise, both projected a strong self-efficacy, rooted in their belief that with effort and persistence, they could be successful. Participant 2 wrote about making “tough decisions,” and having the ability to “be stubborn and keep at it until I get what I want.” She stated, “I believe I had a positive influence on the work done during the group session.” Likewise, participant 3 conveyed his belief that he could succeed despite adversity when he said, “I am energized when a challenge or task is dangling in front of me.”

Participant 6 demonstrated the importance of self-efficacy for both fostering and preventing cognitive change. Participant 6’s fluctuations in self-efficacy corresponded to his willingness or resistance to consider alternative perspectives. Initially, participant 6 believed that he could control outcomes, even in a chaotic environment. He reported, “I took ownership of a process to help ease my own frustration. When I am frustrated, I

look to process and outcome as a comfort. If it is not present, I tend to create it to help me understand." With strong efficacy came willingness to consider alternatives when cued. Participant 6 wrote,

> There was very clear feedback that some already had strong opposition to what I was doing, and I will need to take that into consideration as I think about what direction I will take during the second section of this work.

After participant 6 learned of his pseudo identity, his attitude changed. He displayed resistance instead of openness. Instead of being one of the first to complete his reflections, he became the last. He needed to be prompted by the instructor to submit his reflection. He even opted out of answering some reflection questions, asking, "Will I be penalized if I choose not to respond to these questions? If I will, I will answer them out of necessity." His resistance corresponded to his weakened self-efficacy. In contrast to his previous confidence, he no longer felt able to control his environment. He wrote, "I had many reservations, and still do that this environment will be a successful learning one for me." He also commented that the environment prevented his success. "I know that in order for me to bring my skills into the organization, there has to be a healthy sense of respect, understanding, and value for the treatment of employees."

Self-efficacy undergirds critical reflection (Mezirow, 2000; York-Barr et al., 2006). Mezirow (2000) explained that a strong efficacy is needed for one to be

> critically reflective of one's habitual and sometimes cherished assumptions, and of having the self-confidence to take action on reflective insights. The power to control and determine our actions in the context of our desires and intentions is a

> definition of will. Transformative learning includes this conative dimension. (p. 25)

Efficacy results from successful growth and change and, in turn, leads to greater personal and collective empowerment to enact change (York-Barr et al., 2006). Thus the strength of one's efficacy is an important factor in the process of cognitive change.

Those with strong self-efficacy are willing to engage in challenging mental activities, and view errors as a means to grow and an indication that more effort is required. They see themselves in control of the change process and are willing to endure disequilibrium while holding to an expectation of future reward for their efforts. Those with weak self-efficacy consider error an indicator of incompetence and avoid challenging situations. They feel out of control in the face of change, resulting in anxiety and stress. Such individuals avoid disequilibrium whenever possible. It is more important to them to appear proficient than to expand their knowledge. Heuristic responses may be followed to preserve one's positive self-evaluation. "A strong sense of efficacy [is required] to remain task oriented in the face of pressing situational demands and failures that have social repercussions" (Bandura, 1993, p. 120).

External capacities. Mezirow (2000) claimed that successful change in one's meaning perspective requires supportive relationships and environments. In fact, he called these supports "crucial" (Mezirow, 2000, p. 25). The term external capacities is used here to describe qualities outside a person that support or hinder cognitive change during this period of reorientation. External capacities that support reorientation include adequate time (Amodio et al., 2004; Duke, 1993), opportunity for collaboration (Mezirow, 1991), and the nature of the setting (Armenakis & Bedeian, 1999; Seashore-

Louis, 1998). These external capacities have been well documented and should be considered in any framework that seeks to understand how cognitive change occurs (Duke, 1993; Richardson, 1990; Wei et al., 2009).

Time. Time is important for reorientation because it is required for cognitive decoupling, learning new knowledge and skills, and reflection. The more time one spends thinking about a topic, the more likely one is to understand it. Research shows that teachers must spend at least 49 hours in professional development for it to generate changes in practice that lead to improved student outcomes (Darling-Hammond et al., 2009; Yoon et al., 2007). Cognitive decoupling requires one to sustain inhibition of automatic responses while analytical processes consider alternatives. In the absence of adequate time for those processes to occur, a heuristic response follows (Amodio et al., 2004). Reflection requires one to pause (York-Barr et al., 2006). Without time to consider current practice and try on alternatives, reflection that leads to cognitive change cannot occur.

The data gathered as part of the Experiential Simulations© was not specifically coded for time. Yet, time played an important role in both the chat sessions and the reflection periods. The chat sessions permitted little time for reflection. During the first chat session, participants made frequent requests for a slower pace. Participant 4 entered, “This takes a lot of concentration—slow!” Others made statements like, “My head hurts,” “I’m melting,” and “I’m fried.” Participant 6 dropped out for a period to allow time for reflection and problem solving. When he re-entered the discussion, he wrote, “I’ve sat back and watched the entire conversation without saying a word. Little if any direction is apparent at all.”

The limited time forced participants to react and comment instinctively, highlighting biases. Upon later review of the transcripts, several participants reacted to their rushed comments. Participant 6 reflected, “I think others need to know that I am not as controlling as the transcript communicates.” Musing upon what others might be thinking of her based on her chat discussions, participant 1 wrote, “They want to know why I am such a bitch.”

Amodio et al. (2004) found that, when regulating racial bias was required, slower response times were needed for dorsal anterior cingulate cortex (dACC) activation and response inhibition. In the face of time constraints, participants defaulted to a biased position, ignoring the neural signal of detected conflict.

Although time was pressed during the chat sessions, the ES© provided ample reflection time. After session one, participants had a week to reflect and complete three sets of prompts. Participants had two weeks between sessions two and three in which to complete four sets of reflective questions. It was during this time that participants 2 and 3 described their growing understanding of leadership and power. Two days before the third chat session, participant 2 reflected on her growing awareness:

> I used some of the insights I learned from the chat room work. It was interesting how people respond to what I say, and the impact of what I say has on group work. I found myself talking less and listening more as well as asking people to give me feedback on how I sway decisions. The articles we read last week about giving orders and power really stuck with me. I heard myself saying to the group, the decisions that we make about the work that needs to be done should be dictated by the situation and not by my role.

During the same two-week reflection period, participant 6 became resistant, blaming the instructor for his change in attitude. He wrote, “I really do not like the manipulation involved in this study. Trying to generate a power reaction that is not genuine seems contrived and insignificant.”

There are no limits to the length of time each phase of cognitive change requires. The length of time one spends in each phase varies. This study, however, is bounded by time. Participant data was gathered only over the six week period of the ES©. The superintendency course continued for another eight weeks after the ES© ended. It is possible that with more time, participants 1 and 6 might too complete a cognitive change in their understanding of leadership and power.

Lack of adequate time for educator cognitive change is one factor that has received attention in educational studies. Educators need to be given time and opportunity to examine a new theoretical framework (Richardson, 1990) in order to achieve the Gestalt shift necessary for proper implementation (Nespor, 1987). Too often, educator development provides insufficient time for learning new approaches. Most schools provide educator development in the form of occasional, one-shot workshops, even though research demonstrates that to be effective in creating change, learning opportunities “should be intensive, ongoing, and connected to practice” (Darling-Hammond et a., 2009, p. 9). Furthermore, educators rarely have additional time to plan for change. On average, only three to five hours per week of planning time are given to public school educators, which is far below the 15 to 20 hours averaged in countries where educator development is more successful (Darling-Hammond et al., 2009).

Collaboration. Collaboration is an important part of reorientation as it contributes to cognitive change. Language allows us to organize our experiences and make our understandings and beliefs explicit. Communication with others is necessary to clarify our understandings, negotiate meaning, and arrive at a common experience (Mezirow, 1991). Reflection with others provides novel perspectives and lessens the effect of existing bias (York-Barr et al., 2006). The more a learning experience or environment allows for collaboration to occur, the more likely it is that cognitive change follows:

> Perspective transformation is a social process: others precipitate the disorienting dilemma, participate in alternative perspectives, provide support for change, participate in validating changed perspectives through rational discourse, and require new relationships to be worked out within the context of a new perspective (Mezirow, 1991, p. 194).

The ES© process provided little internal opportunity for collaboration. The only opportunity to discuss the experiences within the simulation occurred in the second half of session three, after the participants' true identities were revealed. During that last collaborative chat session, participants began to process thoughts more deeply than in their solitary reflections. Their thinking benefited from hearing the perspectives of others. The following excerpt from the session three transcript demonstrates how several participants, notably participant 6 (in italics), gained new perspectives from others. (Some spurious comments are not included.)

> *6 >>Interesting for those of us who do not know anyone in the group. I am wondering if we would have felt like outsiders if our identities preceded us?*

2 >>I am going to sit back and give others an opportunity to enter. It feels like a cliche all of a sudden.

7 >>Good point 6. I was thinking that same thing.

2 >>6...I just responded to that 6....I believe that you may have something there. Welcome aboard.

4 >>6, I'm with you. I don't believe we would have tried to be inclusive if our identities were revealed early on, since some of us already knew one another.

8 >>I only know one person in the group, but I am able to connect quickly with people.

6 >>I also wonder how we develop systems of inclusion and how much a part of the system identity plays. So often we think of identity as exclusion.

3 >>As I look at the pictures I am thinking, "all look like intelligent people, why in the world would they want to be a superintendent!"

1 >>I didn't much care if I knew you or not. It's "were you helpful in getting things done?" I just wanted to get it done.

4 >>Why did you all decide to enroll in this course?

9 >>6, say more about exclusion...

7 >>I want to be prepared and ready for different opportunities as I see people retire in my district.

4 >>I do believe that we all have an interest in a broader leadership role within our districts, as well as our respect for ___'s work!

6 >>We often think of identity as an exclusionary tool--what we are not. I like the comment about all being intelligent--did we consider that as an identity that would bring us together?

8 >>I'm with you 7

9 >>I assumed we'd all be reasonably intelligent, probably with more in common than different.

2 >>I agree 6, intelligence is a part of our identity that we share...I'm sure we share other traits as well..

10 >>6 - Why do you view identity as an exclusionary tool?

1 >>6 you are making assumptions about intelligence. It has many meanings.

6 >>How often do we think about what we share as helping us to accomplish any task? That's the question I am thinking about now.

Participant 6 shared how the opportunity to collaborate with others in the class improved his attitude toward the experience. In his reflection following session three, he wrote, “I enjoyed the discussion when persons revealed their identities. Up to that point, I was very frustrated and ready to drop the whole experience and the course.”

Literature in the field of education confirms the importance of collaboration. Support through feedback and encouragement is necessary to complete and sustain such a cognitive reorientation in education (Geijsel & Meijers, 2005). Educators often find themselves trying to implement change on their own. The usual pattern of conversation in schools revolves around complaints about students or administration. Education has traditionally occurred in isolation, with few opportunities for collaboration around professional practice (Lortie, 1975). Some of the most prominent literature surrounding

educator development reports that it must be job-embedded and collaborative to be effective (Wei et al., 2009). Taylor (2009) explained, “It is within the arena of dialogue that experience and critical reflection play out.” Without an opportunity to refine ideas and discuss successes or failures, educators stick to instinctive methods.

The nature of the setting. Change does not just occur within a person, it takes place in a real, external context. External factors can support or discourage change. As Bandura (1993) pointed out, self-efficacy includes a conviction of control not only over oneself, but also over one’s environment. The nature of the setting includes both the environment in which reorientation occurs and the environment into which the change is implemented.

The reorientation setting in this study was the Experiential Simulation©. The ES© included the chat sessions, the pseudo identities, and the reflection periods. The degree to which the participants believed the ES© to be supportive varied. Participant 1 distrusted the ES© environment. She wrote to the instructor,

> I think you were far too secretive with the class. Cloak and dagger is fun, but it speaks to expectations. Now, I don’t trust you as far as I can throw you . . . which I may still try if this headache continues.

Participant 1 also described the environment as limiting and frustrating. She stated, “Hmmm . . . Chaos, imposed order, rebellion on some parts, slow progress. A little bit of everything. No real group pull for a common good.” She added that it was not conducive to learning: “Why did I have to waste my time with a bunch of bozos on a topic I could care less about? Where was the real learning environment here? . . . Stimulate me intellectually, please!”

Participant 6's view of the environment changed in relation to his efficacy. It is unclear whether one caused the other, or whether they simply corresponded. Participant 6 saw the environment as mostly enjoyable during the first two sessions. After session two he reflected, "I actually enjoyed this session. I was amazed that we were pretty insightful to come up with working with small groups in a whole group chat. That's pretty novel." After he realized his identity had been misrepresented to the class, he no longer viewed the context as supportive. He described his distrust, "I again am feeling manipulated by the images. I am starting to build a cynical attitude because I am seeing this as a 'forced' activity rather than a genuine one." His concern extended to a frustration with his classmates: "I am very concerned that the negativity will continue into the face-to-face conversations." About his mounting distrust, he wrote, "I am still concerned about the coalitions that will form during the class. . . I have seen coalitions work in very negative ways, and I am not looking forward to the first part of the class."

Interestingly, others pointed to both participants 1 and 6 as reasons why the class felt unsupportive. All six participants complained about 1's caustic and pushy behavior, even participant 1 herself. Participant 3 called 1 "sarcastic and condescending." Participant 5 expressed similar feelings. She wrote, "I am concerned about our first face-to-face class, especially meeting 1 because I find her intimidating and, so far, her personality distasteful." While some participants appreciated 6's facilitation, it made others uncomfortable. Participant 4 complained, "6 irritated me because in my opinion he was too biased in his facilitation. Specifically, he would push for acceptance of comments made that he agreed with, but didn't often acknowledge those he didn't agree with." Participant 1 more bluntly added, "I might punch 6 right in the face. So far I

think he is a self-righteous pseudo-intellectual. I want to tell him to get real and lighten up or shut up."

Participants 2 and 3 both referenced participant 1's poor behavior (three times and six times, respectively). Still, they maintained a generally positive attitude about the ES© environment. Participant 2 expressed, "This is a really interesting project. I can't wait to see how it all comes together." Participant 3 added,

> I don't have any concerns about the task force meeting face to face. I am hopeful that we have successfully accomplished what was expected. I guess that would be my only concern. As far as meeting the people and being together "live" I look forward to that. I am hopeful that we can be productive in our task force work and accomplish what we need to during the class time.

Neither participant 2 nor 3 were intimidated by the setting, and both ended up taking on a new meaning perspective.

Literature about cognitive change is replete with discussion about the effect that the setting has on enabling or inhibiting change. A person who believes he has the capacity for change rejects the change if the setting into which it must be implemented will not support it. This rejection may occur in two ways. One may reject the change *immediately* because he perceives that the context in which it will be implemented is unsupportive. Alternately, one may attempt the change and then find the conditions of the context constraining, leading one to *abandon* it. An environment conducive to individual change is one in which the organization and those within it support change. Any change must fit the culture of the organization as embedded in its norms, image, climate, structure, and policies (Armenakis & Bedeian, 1999; Hage, 1999). A

supportive climate fosters long-term goals (Weick & Quinn, 1999), enables greater worker control and an organic structure (Hage, 1999), and fosters individual respect and the development of new knowledge and skills (Seashore-Louis, 1998). Factors inhibiting change include a focus on short-term needs (Weick & Quinn, 1999), bureaucracy (Hage, 1999), institutionalized resistance (Agocs, 1997), and isolation (Hage, 1999).

At the same time, neither the learning environment nor the context in which change is implemented can be too cognitively demanding. Cognitive decoupling, reflection, and employing newly learned tasks require concentration and working memory. Until new learning becomes automated, it is processed using System Two resources, with effortful attention (Evans, 2008; Lieberman, 2010). If conditions are such that working memory is overloaded with other tasks, no mental resources are available for implementing new learning. Thus, in situations of high cognitive demand, a person must, by necessity, revert to the automatic, intuitive response.

Cognitive pychologists suggest that the executive functions needed for inhibiting an automatic response and considering alternatives are compromised in situations of threat or anxiety (Eysenck, Derakshan, Santos, & Calvo, 2007; Schmader, Johns, & Forbes, 2008). Threats related to perceived stereotypes disrupt executive cognitive functions through 1) physiological stress responses; 2) diversion of attentional resources for performance monitoring; 3) and increased attention to suppressing negative thoughts and emotions (Schmader et al., 2008). Anxiety due to threatening circumstances impairs processing efficiency, placing greater task demands on mechanisms of working memory and executive function. Such anxiety also impairs

attentional control and decreases one's ability to shift between cognitive tasks (Eysenck et al., 2007).

The experiences of the participants in this study and the findings of cognitive psychologists are consistent with neurological studies. Anxiety as the result of stereotype errors results in increased activity in the anterior cingulate cortex (ACC) (Amodio et al., 2004; Bishop, Duncan, Brett, & Lawrence, 2004; Egner et al., 2007). Such ACC activity is associated with increased function in the lateral prefrontal cortices (Bishop et al., 2004; Egner et al., 2007) as well as heightened activation in sensorimotor regions (Egner et al., 2007). Thus neuroscience studies substantiate the theory that an unsupportive setting can result in neural interference with executive functions necessary for educator cognitive change.

Cognitive Change Phase 3: Resolution

The deep personal change associated with transforming one's meaning perspective is hard—and rare. Although many factors make it unlikely, such change in thinking does occur. The moment of change is often signalled by a sudden breakthrough in understanding, or "aha" moment (Cavanaugh & McGuire, 1994, p. 9). During resolution, a solution to the dilemma is found, or the meaning of the event is understood. The new perspective is the effect of a novel interpretation of one's knowledge and experiences and results in new behaviors (Mezirow, 1991).

Though neither participants 2 or 3 described an "aha" moment, they did write about their new understandings. Participant 2 became aware of her new perspective while leading a group in her real work setting. She explained,

> I found myself talking less and listening more as well as asking people to give me feedback on how I sway decisions. . . . I heard myself saying to the group, the decisions that we make about the work that needs to be done should be dictated by the situation and not by my role.

Participant 3 described her growing realization this way: "Writing the responses to these questions has caused me to think in some new ways about the concept of "openness."

For both participants, these new understandings were accompanied by changes in behavior. Mezirow (2000) claimed that actions consistent with reflective insight are required for transformational learning to occur. Participant 2 noted, "I am more conscious of how I interact with people, especially when we are making decisions about the work we do for students." Participant 3 projected, "I will apply my learnings in real life by being more patient and allowing more time to get to know people before I decide who they are."

Participants 2 and 3 both talked about their new meaning perspectives in ways that are consistent with Mezirow's (1991) claim that "learning is a process of constructing and appropriating a new or revised interpretation of the meaning of an experience as a guide to awareness, feeling, and action." These two participants described how their new perspectives resulted from a reorganization of existing knowledge and experiences. Participant 2 wrote, "I've learned that inclusion is really important. Did I know that already? Sure! However, sometimes we need reminding." Participant 3 reflected, "[What] I would add now is that leadership and organization are key factors as well. I think I knew that before but probably overemphasized 'knowledge of the facts' above."

Resolution reorganizes one's knowledge, understandings, and memories around a new concept which provides a more complete perspective. Although most of the knowledge structures are the same, they are arranged in a new, more meaningful way; this new arrangement has more explanatory power. Stanovich and West (2008a) suggested that one's ideas are comprised of "interlocking knowledge structures" (p. 160) subject to call by neural systems. According to Mezirow (1991), it is through the use of language and symbols that we organize, create and articulate our meaning schemes and perspectives—that our thinking takes shape. Successful change in human meaning perspectives occurs when a moment of disorientation results in a reorganization of one's interlocking knowledge structures around concepts that are fundamentally different and new to the individual. Such a shift results in an understanding breakthrough and provides a basis for new understandings and behaviors.

The concept of cognitive resolution as the result of mental reorganization of one's experiences is beyond the current scope of neuroscience studies. However, the concept of cognitive emotion regulation or emotional reappraisal has been studied. Emotional reappraisal involves a mental reinterpretation of behavioral, experiential, or physiological stimuli to either elicit positive emotional responses or downplay negative ones (Berkman & Lieberman, 2009). Neuroscience studies have indicated activation of neural regions associated with System Two processes, such as the lateral prefrontal cortex (LPFC), the dorsolateral prefrontal cortex (dLPFC), and ventrolateral prefrontal cortex (vLPFC), while accompanied by deactivation of the rostral and dorsal anterior cingulate cortices (ACC) and medial prefrontal cortex (mPFC) during reappraisal (Berkman & Lieberman, 2009; Ochsner & Gross, 2004). These activation patterns are

consistent with a view that reorientation requires inhibition of automatic processes and activation of controlled neural processes.

Neuroscience studies have recently begun to explore the neural basis for insight solutions, or the “aha” moment. Early results inconsistently identify neural regions, suggesting the neural process varies according to the types of problems used to generate insighful solutions (Qui et al., 2010). Studies involving verbal associations have demonstrated activation in the right anterior superior temporal gyrus / angular gyrus (perhaps involving novel associations or priming for lexcial-semantic processing) and the anterior cingulate cortex (perhaps signaling a need for monitoring attention or focus) (Aziz-Zadeh, Kaplan, & Iacoboni, 2009; Jung-Beeman et al., 2004; Kounios & Beeman, 2009). Some studies of verbal insight have shown a deactivation in the primary visual cortex (Jung-Beeman et al., 2004; Kounios & Beeman, 2009), while others have shown a secondary increase of activity in Brocha’s area and the right ventrolateral prefrontal cortex, suggesting perhaps a metocognitive function (Aziz-Zadeh et al., 2009). A word riddle using Chinese logogriphs by Chinese undergraduates localized the “aha” affect in the precuneus, left inferior frontal and middle gyrus (which may correspond to Brocha’s area), and an increase in the inferior occipital gyrus (Qui, et al., 2010). Regardless of the exact neural regions involved, there appears to be a burst of activiation in localized areas corresponding to the “aha” moment.

Visual Model of Educator Cognitive Change

Stanovich and West (2008b) used a flowchart (p. 687) to visualize the divergent points that either fostered or prevented a reasoned, rather than a heuristic, response in tasks involving heuristics or biases. Following their example this dissertation employs a type

of flow chart (see Figure 20, p. 244) to visually model cognitive change in educator development situations—borrowing some logic (cuing, background knowledge, participant capacities) from the Stanovic and West model (2008b), but expanding it beyond the concept of bias. The flow chart illustrates the concept of divergent points toward either a new or existing meaning perspective and suggests a general progression of events consistent with the qualitative data analysis in this study and the literature. Assuming that the educator development involves learning goals outside of participants' pre-existing meaning perspectives, this visual model focuses on the three phases of cognitive change described above. Nevertheless, the existing meaning perspective is important and appears in the upper right portion of the visual model (see Figure 20, p. 244). The discussion of the visual model is organized as follows: 1) Prephase: meaning perspective, 2) Phase 1: cognitive conflict, 3) Phase 2: reorientation, and 4) Phase 3: resolution.

Prephase: meaning perspective. The existing meaning perspective guides everyday actions and decisions. It relies upon a store of memories and knowledge that can be automatically or deliberately recalled to provide meaning to experiences and make decisions. It is the condition in which people normally operate. Within this meaning perspective are all the concepts, memories, and knowledge which contribute to and embody the core concept, which in this case is power over.

Phase 1: cognitive conflict. Cognitive conflict is a necessary first step toward a meaning perspective change. Cognitive conflict occurs when a cue signals that one's prepotent, automatic perspective may be inadequate, but an alternative, more

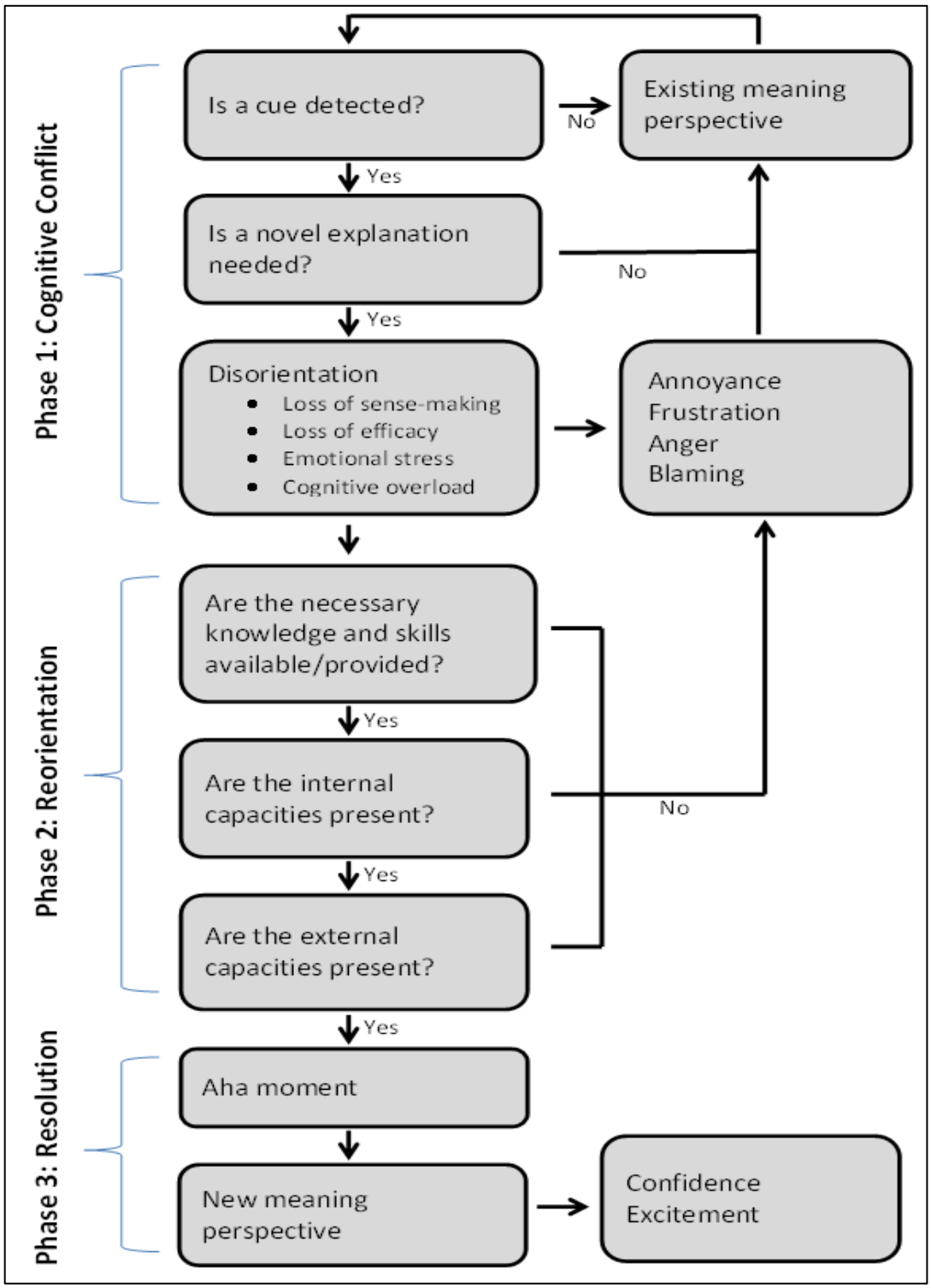

Figure 20: Visual model: educator cognitive change.

explanatory response is not immediately available, resulting in a period of mental disorientation. Two factors contribute to disorientation in this first phase of educator cognitive change. The first is whether a cue is detected. A cue may be new data that is inconsistent with what one expects, or the presence of external or internal feedback signaling an error in personal judgment. If a cue is not present or goes undetected, a person continues to operate within the existing meaning perspective—regardless of whether it correctly informs decision making or actions.

The second factor is whether a novel explanation is needed to satisfactorily fit the phenomenon into one's meaning perspective. One first attempts to use existing knowledge and skills to accommodate the discrepant data. If a satisfactory solution is not readily available and negative feedback continues, a period of disorientation ensues.

Disorientation occurs when a person knows the meaning perspective is wrong, but is unable to devise a better one. The automatic systems upon which one usually relies for understanding and decision making are exposed as unreliable. The feeling of disorientation can have several sources. The unpleasant feeling of disorientation can be caused by 1) physiological and emotional changes, making the logically incorrect response feel right (Bechara & Damasio, 2005; Mohanty et al., 2007; Rubia et al., 2003); 2) a loss of sense making (Weick, 1993); 3) low self-efficacy resulting from the sudden loss of control (Bandura, 1993); or 4) cognitive overload. Disorientation is unsettling and leads participants to seek ways to resolve the conflict, thereby entering a second phase called reorientation. Unresolved cognitive conflict results in anxiety, frustration, and anger. It may express itself in excuses, justification, self-deception, and blaming (Heifetz, 1994: Mezirow, 1991; Pfeffer, 1997).

Phase 2: reorientation. Reorientation is the cognitive process required to resolve cognitive conflict. It involves inhibiting a prepotent response, considering alternatives, and often gaining new knowledge or skills (Stanovich & West, 2008b). This second phase of educator cognitive change has three necessary components: 1) the requisite background knowledge or skills, 2) certain capacities within the individual (internal), and 3) certain capacities outside the individual (external). All three components must be present for reorientation to occur.

If one's meaning perspective is inadequate to explain a phenomenon, then one must draw on certain understandings or abilities to expand or alter that perspective. It is possible that a person already has the necessary knowledge or skills but needs to associate them in a new way. This is how experts make paradigm-shifting discoveries (Kuhn, 1962). Often, however, new knowledge must come to light in order for the person to gain a new perspective. Regardless of whether new information is needed or new connections made between existing pieces of information, one must have the internal and external capacities available to support the acquisition and consideration of that knowledge.

Successful reorientation also depends on the presence of certain internal capacities. An educator must possess sufficient self-efficacy to believe meaning perspective change is possible and to allow current beliefs to be scrutinized.(Bandura, 1993). The person also needs a willingness to be open to new beliefs (Dewey, 1933; Stanovich & West, 2008b) and to reflect critically (Mezirow & Associates, 1990). Finally, one must be able to resist defaulting to an automatic response while gathering

new information and considering alternative responses—what Stanovich and West (2008b) call cognitive decoupling.

Certain, external capacities are also necessary for reorientation. These include sufficient time (Yoon et al., 2007), opportunities to collaborate (Mezirow, 1991; York-Barr et al., 2006), and a supportive context (Seashore-Louis, 1998). Sufficient time is needed in which to gain new understandings, to reflect, and to consider alternatives. Collaboration helps the educator clarify understandings, deepens reflection, and reinforces efficacy. A supportive setting strengthens efficacy, and promotes reflection and openness.

The absence of resolution can create frustration or anger. If a person detects a need for change, but lacks the *internal capacity* to change, he feels frustrated. This may lead to feelings of anger or depression. Excuses or justifications may be offered to explain why the change was not valid. To provide meaning in the face of anxiety, “we may resort to psychological mechanisms of self-deception” (Mezirow, 1991, p. 63). As a result, people hold more tightly to past assumptions, deny that the problem is real, jump to conclusions, or find an issue to distract them (Heifetz, 1994).

However, if *external capacities* prevent change, the feelings of frustration and anger associated with disequilibrium become amplified. A person blames those factors that make him feel powerless. In order to maintain a feeling of control, it becomes necessary to project one’s failure onto something outside oneself, such as a scapegoat (Pfeffer, 1977).

The person necessarily follows the heuristic response, but also experiences feelings of frustration, anger, or sadness. In such instances the person tries to rationalize

the heuristic decision *ex post facto*, and may erupt in anger as s/he attempts to justify what feels right but cannot be understood differently based on the mindware s/he possesses.

Phase 3: resolution. Resolution is ushered in by an "aha" moment (Cavanaugh & McGuire, 1994; Kuhn, 1962). This is an all-at-once occurrence in which one gains new insight. Resolution involves a deep, personal change (Quinn, 1996) that is not reversible, because the new meaning perspective is seen as superior to the old. The knowledge, understandings, and memories are reorganized into a new meaning perspective which can be articulated in a way that is fundamentally different from the old one (Mezirow, 1991). The new meaning perspective becomes the new automatic response that successfully guides action and decision making. Resolution results in new-found feelings of confidence and excitement (Mezirow, 1991).

Applying the Model to Individual Cases

The above model illustrates educator cognitive change from a transdisciplinary perspective. Some have claimed that traveling to "foreign fields in search of new insights" (Varma et al., 2008) makes for good science, especially "if we want to aggregate knowledge across fields and make generalizable claims that have sufficient ecological validity to create traction in the world" (Lee, 2010, p. 644). Samuels (2009) added, "Transdisciplinarity recognizes that the knowledge fragments created by one discipline often need to become integrated with the knowledge from other disciplines in order to have beneficial application to real-world problems and to more comprehensive theory development" (p. 50). This model's usefulness to describe educator cognitive change rests upon its explanatory and predictive power for actual individuals who

encounter conditions intended to prompt meaning perspective transformations. This section, then, seeks to answer the second research question, “How might an original model that incorporates education and neuroscience literature provide explanation for educator cognitive change?”

In this final section, I apply the model to individual cases (participants) from the superintendency course. The application of the model presents a tangible way to picture and examine incidents of educator cognitive change, and is intended to reveal the model’s strengths or weaknesses as well as to suggest explanations for why individual change may or may not occur. If proven useful in a context of real change, this model may predict conditions under which educator change is likely to occur. A predictive model may help educational leaders develop realistic expectations for educator development given the nature of the learning environment, and assist them in planning development opportunities to reach intended outcomes. Additionally, educational leaders may be able to use this model to assist them in understanding, planning, and sustaining change efforts. The model is applied according to the following sections: 1) Participant 1, 2) Participant 2, 3) Participant 3, 4) Participant 4, 5) Participant 5, and 6) Participant 6.

Participant 1

Prephase: existing meaning perspective. Participant 1’s behavior and reflective responses indicated a power over approach to leadership. During the first chat session, participant 1 used sarcasm and ridicule to exert her influence and coerce compliance. She repeatedly made comments such as, “Read the assignment!”, “Who

cares?", and "Leadership issues, vision, and philosophy" to persuade others to her point of view.

Participant 1 acknowledged that her approach was intended to dominate the conversation. She wrote, "I was little more than a pain in the ass. I had some really good ideas, but no patience for the process or input of others." She further confessed, "I know, I know . . . I really have no intention of finding consensus. Shame on me." She described her leadership style as a task master. "In this, a business or work setting/task, I only need to know who can do what and how they can contribute to getting things done." Rather than invite input, participant 1 wanted everyone to follow her. "They need to know I am always right. Then we would be done by now with a product and moving forward."

Phase 1: cognitive conflict. In the first, online chat session, participant 1 received frequent cues that her power over approach was not appreciated by others. At first they tried ignoring her sarcasm, but eventually they began to make comments expressing their frustration with her behavior. One participant interjected, "1, are you always this sarcastic?" Another cautioned, "Easy 1 . . . this is not helping." Participant 1 noticed the cues. She wrote, "I was probably the most negative because of my snotty comments and sarcasm." She added, "They want to know why I am such a bitch, and if I work like that on a regular basis."

Despite detecting cues during the first session, participant 1 gave no indication that she thought a novel explanation or approach was needed. She found others' reactions to her behavior typical, responding, "No, that's about it. People tend to love me or hate me. I think most people who get to know my heart rather than just my work

character like me." Participant 1 described her experiences in session one as a waste of her time, calling it "interesting, but so unrealistic as to be of little value." Nor did she see a need to change her approach in future sessions. She explained,

> I will want to talk less, and be a bit less caustic, but I don't see that happening. There is no reason to be nice in a chat room if you ask me. We were there to work; being sweet gets nothing done.

Participant 1's experiences and reactions can be explained by the cognitive change model. During the first online chat session, participant 1 detected a cue that something was amiss, but she did not recognize that a novel explanation or approach was needed. Rather she felt the problem was with others instead of her, so she persisted in her existing meaning perspective.

In the second chat session, participant 1 again received cues that her power over approach was not accepted. Rather than seeking a novel approach, she described how she intended to take control of the leadership role by setting the agenda for session two: "I'll review the transcripts and identify issues in the three areas we sort of agreed to (but didn't really)." When participant 1 entered the second chat session, she promptly uploaded a summary she created from session one. Her summary provided the direction for session two, just as she planned. In her reflection, she explained, "But in session 2 I played the lead by example role. Why should you listen to me? Because I took all of the ideas YOU ALL offered and made it a workable list."

Despite participant 1's efforts, the group appointed participant 6 facilitator and decided to only allow responses in order of participants' alpha-numeric symbols. Efforts by participant 1 to disrupt the agreed-upon process resulted in correction by the group.

She described her frustration: “It wasn’t any fun when we were just plodding along, taking nice turns and listening to each other.” Participant 1 wanted to continue using her existing power over strategies. “I would like to continue pushing for task and offering to do my part to get it done,” she stated afterwards, but the group’s response demonstrated that an inclusive approach was needed. “It was like no one wanted to jump in any more,” she complained. “They wanted organization and someone to hold their hands.”

Disorientation ensued. She described her loss of sense making when she reflected, “Why did the group crave leadership so badly, but then hassle about if they were a leader or a facilitator? Do you want someone else to make some decisions or not?” Neither could participant 1 make sense of the group’s desire for inclusion. According to her meaning perspective, work goals come before relationships: “I do not care who they are. I hope I am not a very evil person for saying this, but it is true. It’s a work group.” She tried to explain the group’s desire for inclusion, musing, “I suppose some people are ‘people persons’ and they just want to know everything about everyone, who knows why. The only thing that comes to mind is that they like to blur social time and work.”

As a result of her disorientation and mounting frustration, Participant 1 blamed the others, especially participant 6. “I might punch 6 right in the face. So far I think he is a self-righteous pseudo-intellectual. I want to tell him to get real and lighten up or shut up.”

Phase 2: reorientation. Participant 1 could not successfully complete the reorientation phase. She was unable to gain the knowledge or skills needed to take on a

power with/to perspective. From her vantage point, nothing was learned. She said in her last reflection,

> I do not feel like I have learned or gained anything. I'm a pain in the ass that gets things done. Others are who they are, no matter what context you put them in. You still have to deal with extreme differences. No news flash there.

Yet participant 1 did express a realization that may open the door to a new meaning perspective in the future. Despite the limitation of the chat environment and lack of identity, participant 1 realized the group was able to accomplish the task. She described it as a revelation "that I saw us working together."

Participant 1 had a strong sense of efficacy, but lacked a willingness to be open or to reflect critically. She demonstrated her efficacy together with a bit of resistance in her final reflection: "I would have done it all myself and saved everyone else from the drudgery." Rather than reflect critically on her realization that the group actually did accomplish the task together, she dismissed the revelation saying,

> I think we accomplished a great deal. . . . As an individual I would have had it all done in six hours max and the content would have differed little from the final product. We were not creative or insightful. We did not invent fire or find a new way to slice bread. It was all rote work and a great waste of time.

In addition to lacking some internal capacities, participant 1 also lacked certain external capacities in the ES© environment. Within the ES©, participant 1 had little support, limited collaboration, and insufficient time to change her meaning perspective. Participant 1 noted that her abrasive behavior resulted in a lack of support from her peers. After session three, she wrote, "I did shut up more by part II [of session three],

but that was because I was told to knock it off with the sarcasm. I have a hard time talking 'seriously,' so I talked less." The ES© occurred over the period of about one month. It is possible that more time might have been necessary for participant 1 to process a meaning perspective change.

No resolution. In the end, participant 1 did not change her power over understanding of leadership within the parameters of the ES©. In her final reflection she reconfirmed her existing meaning perspective which governed her approach to a group task. She concluded,

> I would have done it all myself and saved everyone else from the drudgery. I would have been thanked profusely as everyone else has something more important to do for the welfare of the children in our district. I may have convened the group for feedback/corrections, just to be politically correct, but I would have entertained little input.

In the absence of a resolution to the cognitive conflict, participant 1 expressed her frustration and anger, blaming the instructor and her classmates. She complained,

> Why did I have to waste my time with a bunch of bozos on a topic I could care less about? Where was the real learning environment here? Even the whole secret identity thing lost its thrill quickly. Personalities were not cloaked! There were still people who like to micro to my macro. There are still the talkers and the feelers and the do-gooders in every group. Barf. I was irritated beyond measure. Get on with it! Stimulate me intellectually, please! So I offered and demonstrated and did it myself. Here! Done! Enough already. But still we droned on with technology issues in a completely dull and uninsightful way and

> in an environment that allowed nothing more. So now it's done (badly, but done) and I have the pleasure of seeing my classmates. I have real names where once I had only irritations.

Participant 1 summary. Participant 1 experienced phase 1—cognitive conflict, but could not complete phase 2—reorientation. After initial cues that a power over approach would not work, participant 1 attempted to apply her current strategies rather than seek a novel approach to resolve any conflict. When repeated cues in chat session two again prompted the need for a novel approach, further disorientation and frustration ensued. Participant 1 was unable to complete the second, reorientation phase because she lacked internal capacities such as a willingness to be open and reflect critically, and external capacities, like a supportive environment and opportunities to collaborate. As a result, participant 1 did not change her meaning perspective. She became angry and blamed others for her frustration. It is possible that if participant 1 had additional time and some supportive, collaborative discussions with peers, she might be able to move to a power with/to perspective, since she did recognize the group's success using an inclusive approach.

Participant 2

Prephase: existing meaning perspective. Participant 2 began with a view of power that can best be described as power over. She was concerned about issues of inclusion, especially regarding race and gender, but she also described her desire to use her experience and position to gain a greater voice. Upon critical reflection, she admitted that others see her using her leadership position to sway decisions according to her preference. Brunner (2002) described one's meaning perspective about power as

having “high fidelity” (p. 703) when one’s true beliefs about power are consistent with one’s actions rather than words. This appears to be the case with participant 2. Although she talked about power in terms of power with/to, her enactments of power were power over.

Initially, participant 2 wrote that making decisions involves “understanding the issues and including stakeholders.” Further statements revealed that by “including stakeholders” she means that they are given opportunity for input, but not for shared decision making. In addition, she described power as something possessed by one, or a few people, rather than shared. She explained how “people naturally look for a leader,” and that she needed to “know who is ‘playing’ the game so that I can know how to play.” She wrote about her desire for the others to “know my experience, responsibilities, and beliefs . . . gender and race. They will also want to know what position I hold and where.” Upon reflection she began to understand her use of power better, and she explained her power over practices,

> I consider the ideas of others, yet, I have been accused of already knowing what I want. I am not sure what others think of me. I believe that people will think that I can be stubborn and keep at it until I get what I want.

Phase 1: cognitive conflict. Cognitive conflict occurred quickly for participant 2. Regarding the strategies she uses to obtain power she said, “I need to know who is ‘playing’ the game so that I can know how to play. Much of our interactions with people are based on prior experience with them.” She continued, “They need to know my experience, responsibilities, and beliefs.” She claimed that her usual influence in her work environment, “I am usually consulted about issues/concerns that are important to

others' work." Feedback from the group, however, revealed that in the anonymous chat environment her use of power over strategies did not work. This discrepancy was a cue that her reliance on her reputation or position was insufficient to steer the conversation. She reflected,

> I offered several suggestions for the group to consider; interim director, and group norms. I thought these were excellent suggestions that were not given credence until mentioned by others. I sat back for a while and read responses from others wondering if my absence would be noticed; it wasn't. I then offered the following: How would our interaction change if in fact we could identify ourselves.

Participant 2 described how she searched her existing meaning perspective for a solution. She proposed, "I will think through a process that I've used that has proven effective." One power over approach she offered was, "I will be more forceful in my writing to gain more respect and attention for my ideas."

In the absence of a ready solution, participant 2 showed signs of disorientation, such as a loss of sense making: "This I found to be frustrating and not typical for me in my daily work." She displayed evidence of her disorientation by reacting angrily. Her reaction also exposed her reliance on power over strategies. She confessed,

> I decided to use some power and not respond to the group when inquiring about signing off. And I refused to exit the system until 6 and others had done so. Individuals who feel powerless will find ways to gain power.

Phase 2: reorientation. Participant 2 remained open, reflected critically on her own behavior, displayed self-efficacy, and sought out new knowledge. She wrote about

her openness to learning through the ES© process. “I would like to better understand this portion of the course. Why is our identity masked, and how will identities be revealed, or will they ever?” She reflected critically on her approach, declaring, “I will also look at ways I responded to others in order to ‘check’ my interaction.” She criticized her previous power over approach to decision making as unrealistic, admitting, “It is difficult to make a decision with all the details and feedback from stakeholders.”

Participant 2’s efficacy increased after the second chat session. “I felt that I was encouraging to others,” she remarked, “as well as giving my input with a level of confidence and trust in my answers.” She also expressed new understandings about group work and leadership: “I realized that in order to get the tasks done, we all have to make some concessions,” she observed, “I believe that everyone realized that we are dependent upon each other to do this work. People acknowledged others’ input and suspended judgment. A system was created to give people a voice and to work in small groups.”

Participant 2 identified herself as an African American female, and after her pseudo photo—a white female—was revealed to her, she reflected, “I do know that people reacted differently to me during the second session, and now I am not sure if it was a result of my picture or a change of heart.” This realization spurred her desire to learn. “This is a really interesting project,” she stated. “I can’t wait to see how it comes together.”

Participant 2 wrote of the new knowledge she was gaining through course readings,

> The articles we read last week about giving orders and power really stuck with me. I heard myself saying to the group [at work], the decisions that we make about the work that needs to be done should be dictated by the situation and not by my role.

She described knowledge gained both through readings and collaboration with peers:

> The article on power in the decision making process was really powerful for me. I am more conscious of how I interact with people, especially when we are making decisions about the work that we do for students. Some feedback I've gotten from staff is to not ask for input if I already know what I want.

In addition to opportunities for collaboration, participant 2 shared evidence of a supportive work setting:

> As I worked with a task force on my job this week, I used some insights I learned from the chat room work. It was interesting how people respond to what I say, and the impact of what I say has on group work. I found myself talking less and listening more as well as asking people to give me feedback on how I sway decisions.

Phase 3: resolution. Participant 2 did not reveal a specific moment in which her meaning perspective changed from power over to power with/to; however, she clearly described her new perspective. The contrast between her meaning perspectives is evident in her answers to the same question in her first reflections and her last. She was asked to describe what she thinks is most important in a decision-making process. After session one she replied, "understanding the issues and including stakeholders." As previously noted, "including stakeholders" for her meant getting their input but not

including them in the decision. After the last session she described power as residing with the group, rather than the leader, claiming it is most important "to understand how the group is going to make the decision; as well as the decision making power of the group."

Participant 2 explained how she intends to put the power with/to perspective into practice. She declared,

> I've learned that inclusion is really important. . . . People who process differently need opportunities to work within their comfort level. How we allow time for people to process and respond is important. . . . And most importantly recognize the contributions of others.

She added, "I do know that we can work more efficiently if we use tools that assist groups with their work, i.e. group norms, action plans, etc."

Participant 2 summary. Participant 2 completed each phase identified in the model of cognitive change. Although she initially used some power with/to language, her enactments of power were power over. Two cues caused her to realize that her actions did not match her stated beliefs. The first occurred when she discovered that reliance on her experience and position of authority carried no weight in the chat room, and she felt left-out of the conversation. This experience helped her understand the frustration of being without power, and the importance of empowering individuals through equal access to decision making. The second occurred when she realized that her increased role in the second chat session may have been due to her false representation as a white female rather than her greater assertiveness, as she had previously supposed. This second cue led her to understand the responsibility of the

leader to create an environment of empowerment to ensure equal power for all, regardless of identity.

After initial disorientation, characterized by a loss of sense making and the resulting frustration and anger, participant 2 quickly recognized that she needed to develop a novel approach to resolve her cognitive conflict. She responded with a willing openness, reflected critically on her own actions and those of people in her work setting, and considered new knowledge she learned through course readings. She collaborated with people at work and received honest, supportive feedback. Her efficacy was high. In the end she came to a new understanding of leadership and use of power. Her meaning perspective changed: instead of seeing leadership as exercising power to make a decision based upon feedback from stakeholders, she now viewed leadership as creating an environment of trust in which all group members share decision-making power.

Participant 3

Prephase: existing meaning perspective. Participant 3 entered the ES© knowing the language of power with/to, but revealed an underlying power over meaning perspective through his reflections. He described the importance of being a "responsive listener," and wrote about "winning the support and trust of many different people," but these were tools to gain power and create buy-in, not share power. According to participant 3, a leader receives power from others when people "decide whether or not to line up behind them." The leader then uses a "clear understanding of the facts," possibly "getting input from all or many of the stakholders," to make decisions with a solid rationale. This process, he claimed, "saves decision makers when the decision may not work out like was hoped."

Participant 3 used power to “filter” input and decide who has a voice: “One thing I think I do is to size up a comment made by someone and then put it in context based on their education and experience.” When the chat group members discussed the need to ensure inclusiveness, participant 3 argued in his reflection that having a voice is an individual responsibility. He wrote, “That one [inclusiveness] seemed like a mystery to me. It seemed as though some thought that not everyone had an equal opportunity to offer input. . . . I think if people weren’t offering input, that is their problem not the group’s.”

Phase 1: cognitive conflict. Participant 3 was cued that his approach to power did not work in the ES© environment when he could not decide whose voice he should listen to—because everyone lacked identity. He explained, “One thing that was hard for me was reading the comments and trying to decide whether it was legitimate or not.” He later added, “It is difficult to know who to take seriously. All there is to base your thoughts on is what has been keyed in on the computer.”

The second occurred when participant 3 discovered that without his own identity, he did not have a voice. He explained, “I did have some feelings of wanting to exert greater presence but could not really think of ways to do it when limited with only keying in thoughts.” He further clarified, “I would say this group did not react to me in the same way other groups do. I am sure that some of that is due to my current position.” Later he acknowledged, “I think because of the positions I have held . . . it was an adjustment for me to not have quicker responses from my classmates.”

Participant 3 wanted to apply his typical solution to the dilemma by using identity to preference voices. He wrote, “I want to know what they do and what their

experiences are because I think it will impact how I work with them." He added, "I think others would need to know the same thing about me as I would want to know about them." Yet he also realized that he needed a novel approach, acknowledging that "in a chat room you can't do any of the non-verbal cueing that can be effective in good communication." He planned to, "work harder on working with the team to determine what we need to do with the task."

Participant 3 experienced disorientation due to loss of sense making and cognitive overload. He that the chat room environment was "just so much different than the way I normally get to know someone that I feel I'm not much more than typewritten manuscript and an electronic photo on the internet." The work of "trying to assess the inputs offered by others while keeping in mind the task" proved too much for participant 3. He admitted, "I did find myself thinking hard most of the time but experiencing periods when I just had to check out for a minute or two and let my mind rest. Fatigue certainly set in periodically."

Disorientation led to frustration for participant 3, particularly about the lack of feedback he received in the chat room. He complained that when he offered an idea that he "thought was decent . . . it would just die on the vine." He explained, "With the chat room I don't feel that I get a fair shake. I feel limited because I can't put forth what I consider to be some of my strengths and assets."

Phase 2: reorientation. Participant 3 possessed the internal capacities required for reorientation. He reflected critically on his experiences; for example, his realization that feedback to one's contributions is vital. He wrote, "First, it confirmed that people were actually listening/reading, and second it made me feel as though I had made a

productive contribution to the larger group." He began to recognize the need to resist filtering people's input. He concluded, "Even though we may try to fight it, many/most of us probably do communicate differently with individuals based on their gender and appearance."

Participant 3's critical reflection also helped him understand the importance of sharing power. He noted that in the ES© environment the group "didn't really have much choice but to work together toward achieving the goals of the class session." As a result, he began see the importance of group processing. He stated,

> Things are happening so fast it minimizes the time one would have to think about another's gender or race . . . I seemed to be drawn toward those who inputted text that was solution focused and that offered productivity to the process of organizing the material.

Despite his disorientation, participant 3 remained open and willing to change. He admitted, "Even though I find myself with impressions of some of the people, I question whether they are accurate or not and am not sure how to attach myself to them." Participant 3 questioned whether the pseudo photos were real, but remained open to the possibility. He wrote, "If they are not my real classmates, that is ok too, and I look forward to whomever has been keying in text." After learning that he had been represented by a pseudo photo, he commented, "This could evolve into a very interesting opportunity to learn about the world through the eyes of others!"

Participant 3 also maintained a positive self-efficacy throughout the experience. This was reflected in the way he described his contributions to the group. "I felt positive about the influence of my 'process suggestions,'" he wrote. He later added, "I think my

input was valued and implemented and contributed to the overall good of the work we did." Participant 3 ultimately described himself as motivated by the challenges: "I learned that I am energized when a challenge or a task is dangling in front of me."

Participant 3 indicated that the external capacities needed to support change were present as well. He felt that his classmates supported him within the large group. He wrote, "On a couple of occasions others would respond with, 'Deep thought 3' or 'That is a good point,' things like that." He also reported feeling supported when the group broke into subgroups for part of the sessions: "I found my small group members to be pretty supportive of the inputs that I shared." Participant 3 makes no specific references to collaboration outside or inside the ES©, but the time involved must have been sufficient for cognitive change to occur.

During the period of reorientation, participant 3 continued to express his old meaning perspective until two additional cues occurred. When he learned that the pseudo photo which represented him was an African American male, he admitted, "It did catch me a bit off guard." He then reflected,

> One thought I can remember having during the first session [before the photos were observed] and through the early part of the second session [after the photos were observed] was "I feel like some of the input I throw out there is pretty decent, but I don't get many bites on it" . . . I would be very disappointed to learn that because I was represented as an African American male that I would have received less credibility and would be taken less seriously than if I were represented as a white male.

Participant 3 recalled literature he had read about racial bias: “I know there is research out there that would support that this actually happens.” This caused him to critically reflect on his previous assumption that it was the nature of the chat environment, not the photos, which governed the conversation. He expressed eagerness to learn more about this topic, saying, “This could evolve into a very interesting opportunity to learn about the world through the eyes of others!”

This revelation also prompted critical reflections about his assumptions concerning the use of power over. He wrote,

> Whatever subtle skills we have learned over the years, that we may not even be aware that we use, can’t be used in the chat room setting. Therefore, that may bring about some frustration by some members because they are not getting the response that they may expect. Again, I think a lot of that comes from positions of influence or ‘power’ that are held and what the common standards of etiquette might be from the audience.

The final cue for participant 3 was disappointment as a result of a few people being given the authority to work on behalf of the entire group. Anticipating this to be a good thing, he projected: “The subgroup ‘point people’ will need to do a good job of communicating to the other ‘point people’ so we are able to consolidate the information into the desired final product.” However, participant 3 was not a point person. He felt dissatisfied with his level of input and afterwards reflected,

> I think it would have been nice to assemble the final product as a group. It seems as though the final product will be determined somewhat based on three people, one from each subgroup, and I am not sure that is the right way to do it.

Phase 3: resolution. Participant 3's "aha" moment appeared in his reflection, where he stated the following:

> Because I am thinking about identities and the possible consequences of spending life stuck with who we are, I would make the following announcement: "As current and future educational leaders, let's make a pact right now that each and every one of us will make a conscious effort to think back to this class and this 'lesson in identity' and agree not to feed into stereotyping and to give every new person we meet an opportunity to reveal themselves over time so as not to stereotypically 'count them in or count them out' before we have ample reason to do either."

Although participant 3 described a new meaning perspective based on power that is shared rather than power consolidated by one person granting preferred input to certain stakeholders, he still has room to grow in his understanding. He wrote about sharing decision-making power. "The exchange of ideas and dialogue between the key players is crucial to decision making."

He made it clear that his intent was to allow a greater voice by all participants, stating, "A variety of inputs from the stakeholders is important as one attempts to arrive at a decision that can be acceptable to all or most." He further acknowledged, "A nice mix of experiences and backgrounds in a subgroup can be helpful to the overall process."

Earlier participant 3 described getting one's voice heard as the participant's individual responsibility. Now he saw it as a leader's responsibility to organize an inclusive environment. He wrote, "It was too difficult to do much with it [factual

information] until the group had an opportunity to lead and organize so that something could be accomplished." He explained how his new understanding will influence his own leadership: "I will apply my learnings in real life by being more patient and allowing more time to get to know people before I decide who they are."

Participant 3 summary. Participant 3 entered the ES© with a power over meaning perspective in which a leader consolidates power from followers and seeks input on decisions only to create buy-in and justify poor decisions. He is cued that his conception of power is faulty when he struggles to exert influence without his identity and experiences first-hand the frustration of not having a voice.

Participant 3 demonstrated the internal capacities of strong efficacy, openness, and critical reflection during reorientation. He gained new knowledge by reflecting on his experiences and recalling past literature. He described support from his classmates, but did not specifically refer to the external capacities of time or collaboration.

Participant 3's reorientation included additional cues that helped him to further reflect and to refine his new meaning perspective. The discovery that he was falsely portrayed as an African American male rather than a white male caused him to rethink his own experience and lack of voice. His dissatisfaction with work performed by a few on behalf of the group enabled him to see the fallacy of creating group buy-in through token participation.

In the end, participant 3's meaning perspective shifted to a shared approach to power. He expressed the realization that it is a leader's responsibility to include every voice, especially those that may be left out due to bias. He also described the importance of an honest exchange among stakeholders rather than mere symbolic input.

Participant 4

Prephase: existing meaning perspective. Participant 4 described her initial meaning perspective in terms of power with/to. She wrote how decisions require a group "brainstorming stage" and "a long dialogue process." She expressed the need for equity and respect for "the opinions and process styles of each member," and described her own leadership style as "collaborative (participatory), yet directive, assertive, and innovative."

Phase 1: cognitive conflict. Participant 4 received some cues that were similar to those experienced by the others. First, she found that she was unable to exert much influence on the group. "I would have preferred to provide more input on the issues that were important to me," she explained. "I would have liked to assist in organizing the chat." Participant 4 also received some negative feedback concerning her behavior. In the first chat session she drew criticism by using all caps, repeated exclamation points, and sarcasm to try to get her point across (e.g. CHAOS IS THE TRUE IMPETUS TO CHANGE!!!). Participant 6 portrayed her as "somewhat pushy, sarcastic, and very involved in getting a message across."

Participant 4 described her disorientation: "I felt like the antagonist in the group. I was neither influential nor directive." She also vented, "The larger group chat is frustrating since I feel that many times I'm not heard." In her final reflection after session three, participant 4 admitted, "I hated the on-line experience so much that I dreaded returning for the second session."

She first attempted to solve her disorientation by establishing identity. She wanted others to know about her "professional and educational background" because

her “reputation and experience probably influence others to respond to [her] more positively.” In fact, on several occasions in the chat space she inputted the phrase “I love this group,” hoping that members of her cohort could use that phrase to identify her. She realized she could not rely upon identity in the ES© environment, however, and admitted it was not the best way to solve her dilemma. She mused, “The lack of identity did impede the process to some degree, but I’d say the lack of structure during the chat impeded it more.” Rather than using assertive behavior, she now intended to focus on a process to enable inclusion of all participation. She resolved, “I will stick to the issues and the process. I will attempt to be sensitive to the inclusion of all task force members.”

In the second chat session, participant 4 found that her inclusive approach was successful, resolving any disorientation without a need to change her power with/to meaning perspective. “The participants were respectful, patient, and encouraging to me during session two,” she reflected. “The group reacted to me more positively when I was less assertive. That’s usually the case. I’m received more favorably if I display collaborative, respectful, and less assertive behaviors.” Participant 5 noticed 4’s new approach and wrote, “The most surprising change, for me, was in 4. I felt she was working with us this week and had given the process a lot of thought between the two sessions.”

Since participant 4 found a solution to her cognitive conflict within her existing meaning perspective, she did not need to undergo phases two and three. Through the remaining reflections, participant 4 continued to describe herself as holding a power with/to perspective. After session two she wrote that decision making involves,

"consensus on decisions, plenty of dialogue time, and an organized mode of deliberating so as to include all participants." In her final reflections she described decision making as "the ability to organize and determine the level of collaboration needed to accomplish the task force goals."

Summary. Participant 4 initially described a power with/to meaning perspective. Lacking her accustomed identity, she tried several approaches to exert influence in the first chat session. She received cues that her approach was not effective and that her efforts angered others. She devised a solution from within her existing power with/to meaning perspective to achieve the desired results in session two. Although briefly frustrated due to her disorientation after session one, her conflict was resolved without the need to undergo reorientation or resolution.

Participant 5

Prephase: existing meaning perspective. Participant 5 held a very clear distinction between power over and power with/to approaches. Although she did not use those terms, she unmistakably defined the two approaches in a portrayal of the group's dynamics: "From that point on, the group started to divide into separate camps depending on whether or not they wanted a designated leader or facilitator, or wanted 'collaborative leadership.'" She described her own use of power as power with/to, saying, "My style is to attempt to find ways for group members to work together successfully and to develop strategies that honor everyone's voice."

Participant 5 was critical of those who used a power over approach. She complained, "Student 1 is, in my opinion, an example of negative power and/or influence. I believe that her sarcasm, impatience, and immaturity greatly hampered the

group's work." While she appreciated the orderliness that participant 6 brought to the group work, 5 recognized that he too, in fact, used power over tactics. She wrote, "[6] is very careful about including everyone's point of view and acknowledging dissention, but after consulting with the group, she decides on what seems to be the best idea and can influence the group to agree with her." (Participant 5 used a feminine pronoun for participant 6 because his pseudo identity was a woman.)

Phase 1: cognitive conflict. Participant 5's first conflict cue was her shock at the behavior of others in the group, especially participant 1, and her own unwillingness to address it. She confessed, "I was not satisfied with the role I played . . . I became more and more disturbed by the rude and sarcastic comments yet did nothing about it." She admitted being intimidated by 1, and shared, "I have taken an extreme dislike to her." Like 4, participant 5 was also cued by her lack of influence due to the absence of identity. "I felt invisible last night and did not feel a connection to anyone in the group," she wrote. She explained that she was used to having more influence:

> This group did not respond to me the way other groups react to me. A key reason for this difference is that other groups I work with know me very well and over a long period of time I have built a reputation based on trust and respect.

A third cue was the inability of the group to create a clear focus to the discussion. Participant 5 wrote, "By the end of the evening I felt like a rat in a research laboratory and was wondering what any of this had to do with understanding the role of the superintendent in a school district."

Participant 5 was disoriented by the emotional stress. She reflected on her discomfort,

> Just when I think I've got this confidence thing down, something like Monday night occurs to throw me off track again. I was disappointed that I did not intervene when 1 and 4 were being so rude and that feeling of being invisible, of not truly having a voice, was horrible.

She admitted, "I am honestly considering dropping the course and taking it at a later date" as one way to deal with her disorientation. Participant 5 remained in the course, however, and suggested possible solutions in keeping with her power with/to meaning perspective.

> I would like the group to create an agenda for the evening so we can have a more meaningful dialogue . . . And I would like it if we rotated group facilitators about every half hour or so, because, in my mind, that is a more collaborative way of working together.

She used power with/to language when she described the group as "more careful about what they contributed to the discussion" in session two, explaining that "by more careful, I mean more inclusive of group members and offering more encouragement and support to group members' ideas."

Concerning her own approach, participant 5 added, "I don't need the others to know more about me at this time; I want them to know that I like working collaboratively and truly believe that the whole is bigger than its separate parts." In her final reflection, participant 5 maintained her power with/to interpretation of events. She concluded,

> I think the group participants worked very hard to include everyone in the process. When I look back over the transcripts, I see that all group members have had an opportunity to share their ideas and contribute to the final product.

Since the ES© encouraged a shared approach to power consistent with her own meaning perspective, participant 5 remained positive, even when she found out she was represented as an older, white male. After her pseudo photo was revealed, she commented, “I really don’t have any frustrations or concerns about this new photo, because I think the whole concept is fascinating.” Still, she displayed no tolerance for participant 1’s continued efforts to assert power over. She wrote, “I want the class to come down collectively on student 1 because she is so inappropriate and rude. Student 1 is, in my opinion, an example of negative power and /or influence.”

Summary. Participant 5 entered the ES© with a power with/to meaning perspective. She experienced cognitive conflict as a result of several cues and her following disorientation. In contrast to her real-world experience, in the first session of the ES© participant 5 had limited voice or presence. This left her frustrated and upset; however, she approached subsequent sessions expecting the group to utilize power with/to strategies. She was not disappointed, and observed the groups’ actions in sessions two and three through a power with/to lens. The congruence between the ES© and her meaning perspective left her excited about the experience.

Participant 6

Prephase: existing meaning perspective. Participant 6 described himself as having power with/to beliefs, but his actions revealed a power over meaning perspective. In his first reflection, participant 6 shared his beliefs about the group

decision-making process. Most important, he wrote, is “establishing an agreed upon process (complete with groundrules for communication and collaborative norms), determining how decisions will be made, and agreeing on the common purpose of the group (complete with outcomes).” He envisioned himself exhibiting power with/to leadership:

> I tend to organize and then step back to let the flow of ideas and input guide process. I also want them to know that I am genuine in my desire to include those voices that are usually excluded rather than included. It has been a hallmark of the work that I do on a daily basis.

In the chaos of the chat room, however, he revealed his actual approach as power over. He dropped out of the conversation for about an hour and then re-entered it with suggestions for how he could create order.

The reactions of other participants provide perspective on his behavior. Participant 4 commented, “6 irritated me because in my opinion he was too biased in his facilitation. Specifically, he would push for acceptance of comments made that he agreed with, but didn't often acknowledge those he didn't agree with.” Participant 1 was the most outspoken, and she wrote,

> 6 bugged me in session one. It was like they waited for the flames to get high, then jumped in and said ‘I will save you!’ and everyone went ‘ooh, yes, thank you 6, we needed some leadership!’ No. That’s manipulation. . . . 6 reminds me of a PE teacher who likes to tell everyone to run the mile, but you’re not so sure they could do it themselves. Bad leader? No, but resented maybe.

The inconsistency between participant 6's stated beliefs and his actual behavior fits Brunner's (2002) findings of "high fidelity" (p. 703) between a person's ontological position and her/his actions. Brunner explained that, in her studies,

> [People] who conceived of power as over others viewed collaborative action through the lens of power-over. That is, they believed that collaborative groups were led by one individual who had permission to enact his or her own power autonomously or some variation of this belief. (p. 703)

Phase 1: cognitive conflict. This discrepancy between his beliefs and actions was not lost on participant 6, and it cued conflict for him. He argued, "I am not as controlling as the transcript communicates," but acknowledged,

> I think others will be mad and frustrated with me. I took a process and directed it to a place that they may not have wanted to go. There was very clear feedback that some already had strong opposition to what I was doing.

These cues led to disorientation for participant 6. He experienced a loss of sense making and argued that the others' reactions to him were "VERY DIFFERENT!" compared to his work world. He explained, "I usually am known for my skills in facilitation and respectful communication."

Participant 6's disorientation generated frustration, anger, and blaming. "I have never found a learning process as painful, purposeless, and debilitating as I did the first hours of this," he said. "I am struggling to see how this exercise ties into the skill set that will be required of me as a superintendent." After the pseudo photos were introduced, participant 6 remarked skeptically,

> If this is indeed not the class with whom I am studying, I will be angry. Angry that I have forged potentially destructive perceptions [apart from] interactions, and relationships with persons who have been manipulated by the same process I was.

Participant 6 did not recognize that a novel solution was needed. Instead, he sought to resolve the conflict by sticking to what he believed were power with/to behaviors. He described his approach to the second chat session: “My goal is to get the work done in a calm, compassionate, inclusive manner.” What he hoped to do differently, he explained, was “listen to more of what the group needs . . . I will try to control my responses and bring them back to a level where others can offer more suggestions and input.” He added, “I want to be able to step back and let others facilitate.”

Although participant 6 made some efforts to be supportive in session two, he soon found himself directing the online conversation once again. In fact, he contributed nearly twice as many entries as the next most active participant. He experienced less resistance to his leadership during the second chat session, leaving him “much more satisfied this time.” He felt the others were “more open to facilitation and the necessary processes involved in decision making,” and reported that his role in the chat room was consistent with his role in the real world. Lacking cues otherwise, participant 6 believed his cognitive conflict was resolved. He noted,

> I tend to facilitate. I like to bring the ideas to discussion and get groups working together. I think some will look at my style as pushy, and I am comfortable with that as long as I am inclusive and respectful during the course of the work.

Buoyed by support for his existing meaning perspective, participant 6 declared, “I actually enjoyed this session.”

His confidence was short-lived. Two days later he viewed the pseudo videos and suspected they were false. “I felt manipulated with the photo images and I am feeling more manipulated by the video presentations,” he grumbled. Yet he seemed to recognize that a novel approach to power was necessary to resolve his conflict: “I really do not like the manipulation involved in this study. Trying to generate a power reaction that is not genuine seems contrived and insignificant.” Perhaps that was why he began to defend his treatment of others. He claimed, “I treat all of the persons with anonymity. Especially now, since I believe that I am being manipulated to change my interactions based off of a manufactured identity.” When asked to react to his classmates’ visual identities, he refused. Instead he asked, “Will I be penalized if I choose not to respond to these questions?” Participant 6’s renewed conflict caused him disorientation revealed as emotional stress. He explained,

> I am, quite honestly, feeling VERY frustrated with this process, and I am struggling to see how this exercise ties into the skills that will be required of me as a superintendent. I am still trying to keep an open mind to the process and trust that it will bring about a good result. But, I would honestly say that if I could take this class and not be subjected to this study, I would.

Phase 2: reorientation. Participant 6 appeared to have *knowledge and skills* to apply to his dilemma. He reported, “I use consensus building tactics and Adaptive School techniques that I have learned over the years of facilitation I have been a part of.” He also referred to knowledge acquired through his doctoral work:

> As a person who is working on a dissertation that explores the results of online learning environments, one of the benefits persons identify is that there is no identity that is predetermined by anything other than what is typed and expressed. Trying to blend in an identity that is not genuine doesn't seem to fit here just for the purposes of studying power.

Despite his knowledge, participant 6 lacked the *internal capacities* needed to support a meaning perspective change. Originally, he displayed a strong self-efficacy. After session one he declared, "I took ownership of a process to help ease my own frustration." But after realizing the videos were not real, his efficacy plummeted. Rather than posting his reflections immediately after the chat sessions, as he had done previously, he waited until the last minute to submit them, even requiring a prompt from the instructor. He expressed uncertainty in his ability to influence the class. "I hope it changes," he wrote. He no longer wanted to be in control: "I do not want to be facilitator in a class that I want to be learning in." He described the need for a "healthy sense of respect, understanding, and value for the treatment of employees" in order for him to be successful.

Although he made frequent claims of openness, participant 6 often qualified his statements with reasons he could not be open. For example, after seeing the false videos he asserted, "I am trying to be open minded, but it is very difficult as I am now certain that they are not my actual classmates." Instead of openness, he displayed resistance by giving short, terse responses and refusing to answer some questions. He explained, "It made me resentful and shut down my desire to continue with the course and the study."

Before seeing the false videos, participant 6 gave evidence of critical reflection. In response to negative feedback about his leadership, he acknowledged that he needed to “listen to more of what the group needs,” and that he “would invite suggestions on how to do that differently.” At the same time, he excused his behavior, claiming, “I am not as controlling as the transcript communicates.” After viewing the false videos, he wrote, “I am starting to build a cynical attitude because I am seeing this as a ‘forced’ activity rather than a genuine one.” Rather than consider new ideas, he declared, “I do not have a real significant learning at this time.”

Participant 6 also lacked the *external capacity* of a supportive environment. After the final chat session, he described his concerns about the other members of the class: “Persons were disrespectful to one another, dominated the conversation, formed coalitions and brought the level of interaction to an all-time low.” He wrote several times of his concerns about coalitions as he anticipated the first face-to-face class. He fretted, “I have seen coalitions work in very negative ways, and I am not looking forward to the first part of the class.” He also described the course environment as unhealthy: “I had many reservations and still do that this environment will be a successful learning one for me. I am very concerned that the negativity will continue into the face-to-face conversations.” He now regretted taking over the facilitator role, claiming it attracted more negativity towards him and placed him “in an awkward position because the group views the person with either disdain or reservations.” Participant 6’s concern over backlash and his inability to control it prevented him from critically reflecting on his meaning perspective.

Participant 6 gave no indication that his approach to decision making and leadership changed from his original power over perspective, which was couched in power with/to language. His last reflection revealed his frustration, which he blamed in part on the negativity of the class. “One of the most important factors of a class is that it include healthy dialogue,” he stated. “I learn from that dialogue. When that dialogue is negative, I read it as a waste of time, energy, and opportunity.” Indirectly, he blamed the instructor’s structure of the course, suggesting his failures were due to conditions outside of his control: “I have many reservations and still do that this environment will be a successful learning one for me.” He concluded, “a lot of tolerance for unacceptable behavior has been taking place.”

Summary. Participant 6 entered the ES© confident in his ability to control and lead a group environment, using the language and behaviors of a power with/to philosophy. The reaction of some participants to his controlling behavior cued him that something in his approach was not working, resulting in disorientation due to loss of sense making. To resolve this cognitive conflict (phase one), he planned to reapply what he believed were power with/to strategies in the second session. In the chat room, however, he once again seized control of the group process and dominated the conversation. Though initially he was satisfied that he had resolved his conflict, his realization that false photos and images were being used to highlight power reactions created further conflict. He may have recognized the inconsistency between his stated beliefs about power and his actions. Needing a novel approach to solve this conflict, he entered reorientation (phase two).

Participant 6 did not complete the reorientation phase. He had access to knowledge from previous encounters with “Adaptive School techniques” and his own dissertation work with online communication. After seeing the false videos, however, he lacked wholehearted (Dewey, 1933) openness, displayed resistance, and became defensive rather than critically reflective. His efficacy plummeted. An unsupportive environment played a large part in participant 6’s increasingly pessimistic attitude. He felt the negativity directed toward him and feared the forming of coalitions. Still, he dismissed his defensive posture by blaming others’ behavior, the structure of the course, and the instructor’s tolerance for inappropriate behavior. Within the span of the ES©, participant 6 gave no indication that his meaning perspective changed.

CHAPTER SIX:

CONCLUSIONS, IMPLICATIONS, AND LIMITATIONS

This study primarily seeks to shed light on the persistent dilemma of educator cognitive change by creating a model and applying it to individual cases. Since new understandings of complex human phenomena require attention to both biological and sociological conditions (Lee, 2010), this qualitative study employed several unconventional and innovative means including a transdisciplinary approach and an analysis of Experiential Simulations© data. This chapter discusses the usefulness of all aspects of this study through these sections: 1) Conclusions; 2) Implications; and 3) Limitations.

Conclusions

In addition to a model of cognitive change, the study generated nine conclusions. First, the outward indicators (conflict and emotion) of behavior that were used to select study participants proved to be unreliable predictors of cognitive change. The assumption that those who showed high conflict and emotion in the chat space were likely to experience cognitive change did not play out in this instance. Participants 1, 2, and 4 were predicted to change, but only participant 2 did. Likewise, participant 3 was not expected to change and did. It may be that the assumptions were faulty or that the sample was too small. It is also likely that participants' public display of conflict and emotion were muted due to the influence of social conventions. Also, conflict in the chat space and ontological conflict may be fundamentally different. Additional research is required to further explore the relationship between participants' visible conflict and cognitive change.

Second, among the factors identified in this study as influencing change, none appeared as the primary influence in prompting cognitive change. For example, theorists cite both reflection (York-Barr et al., 2006) and openness (Dewey, 1933) as important factors for change, but among study participants there was no clear pattern between those factors and resulting change. For the two participants who resisted change, one displayed openness and the other did not. Furthermore, all participants demonstrated times of reflection regardless of whether they experienced cognitive change.

Third, this study does support the conclusion that there may be an interrelated set of dynamic factors that underpin educator cognitive change. The two participants who changed (2 & 3) possessed all the factors that positively influence change and showed few of the factors that negatively influence it (see Figure 16, p. 191). Both demonstrated reflection, openness, positive-efficacy, and background knowledge while lacking resistance and negative efficacy. They also met all conditions identified in the educator cognitive change model: 1) detecting a cue; 2) gaining new knowledge; 3) being open and reflective; 4) displaying positive self-efficacy; and 4) having sufficient time, support, and opportunity for collaboration.

Fourth, this study provides a model for examining educator cognitive change where none currently exists. The educator cognitive change model proved useful to understand all six participants' experiences during the ES© as recorded in their ten written reflections (responses to instructor prompts). This study reviewed their reflections and the transcripts of three synchronous chat sessions through the lens of the educator cognitive change model. In each case, the model clarified participants'

experiences and provided a possible explanation for why some participants underwent cognitive change and others did not.

Fifth, the model identifies some of the reasons cognitive change is difficult and provides tangible explanations for the phenomenon. Operating according to one's existing meaning perspective is efficient and useful. Altering one's prepotent automatic processes is not. Reliance on automatic processes is so strong that every input is shaded or interpreted according to one's existing meaning perspective. This model suggests that even the most receptive educator needs to 1) detect a cue that the existing meaning perspective is insufficient; 2) gain new knowledge; 3) have opportunities to collaborate in a supportive context; and 4) be provided sufficient time if cognitive change is to occur.

Sixth, this study and resulting model demonstrate that the process of educator cognitive change is a function of normal neural processes in conjunction with certain external and internal conditions. This study establishes resistance as a symptom of underlying conditions rather than an impediment to change; shedding new light on a leader's approach to influencing cognitive change. As a result, the responsibility for change shifts away from the individual educator and onto the leader.

Seventh, by establishing resistance as a symptom, this study suggests that influencing educator cognitive change requires more than overcoming resistance; it requires creating a culture that supports both the needed internal and external capacities. This model assists the educational leader to identify and predict conditions under which educator change is likely to occur. In contrast, policies intended to coerce compliance

through either incentives or punitive measures do not support the mental processes of change and are, according to this study, less likely to succeed.

Eighth, a transdisciplinary approach is useful for providing insight that is not readily apparent through single-disciplinary approaches. The educational literature enabled the researcher to interpret participants' use of and ontological shifts in power (Brunner, 2002). Neuroscience literature suggested explanations why conflict cues may either lead to self-regulation (De Neys et al., 2008; Egner et al., 2007; Mohanty et al., 2007) or be disregarded (Inzlicht et al., 2009; Westen et al., 2006). Education, neuroscience, and cognitive psychology helped parse sources for disorientation, and identify them as a loss of sense making (Bechara & Damasio, 2005; Lieberman, 2010; Weick, 1993), emotional conflict (Behcara & Demasio, 2005; Mohanty et al., 2007; Rubia et al., 2003), loss of efficacy (Bandura, 1993), and cognitive overload (Bannert, 2002; Kelley & Lavie, 2010; Willingham, 2009). Together, these three disciplines informed the educator cognitive change model.

Finally, based upon the data reviewed for this study, Experiential Simulations© is a powerful tool for influencing educator cognitive change. Of the four participants studied who began the ES© with a power over meaning perspective, two described acquiring a power with/to perspective as a result of their involvement. The ES© format provided many of the conditions identified in the educator cognitive change model. Importantly, the ES© platform cued conflict, enabled disorientation, provided opportunities for reflection, and introduced new knowledge through course readings. ES© is limited, however, by the inability to control certain internal and external capacities needed to support cognitive change.

Implications

The study's implications are outlined in the following sections: 1) Educational Leadership, 2) Educational Leadership Preparation Programs, and 3) Future Research.

Educational Leadership

Educational leaders manage change in schools. Successful organizational change results from the collective change of individuals' behaviors (Reeves, 2009). Affecting individual change, therefore, is at the core of school leadership. By identifying the processes and conditions of educator cognitive change, this model may be useful in two ways. First, the model may provide leaders with a tool to plan experiences which promote desired cognitive change. Second, the model may aid leaders in understanding and interpreting individual cognitive change experiences.

By identifying the factors and capacities involved in cognitive change, this model provides a road map for an educational leader to create learning conditions conducive to individual change. If the change requires a new meaning perspective, the leader must make certain that the difference between the existing concept or practice and the proposed change is unmistakable (clearly cued), and that educators recognize the need for a novel solution. Leaders should conduct an analysis of external capacities to determine whether they are sufficient to support the proposed change. The leader should also enable educator self-efficacy, reflection, and openness by providing the necessary knowledge or skills, time, support, and opportunities for collaboration.

If individual cognitive change does not occur, the model assists the educational leader in understanding an individual's experiences. In this way the model serves as a diagnostic tool to identify impediments to change and to provide targeted support. The

model enables educational leaders to recognize that non-desirable behaviors are symptoms of a flawed development process. Frustration, anger, and blaming are normal symptoms of disorientation and unsuccessful reorientation rather than impediments to change. Instead, resistance may signal that the educator development experience did not provide a sufficient cue that change was needed or that a novel solution was required. If participants are unable to make sense of the proposed change, then more knowledge is required. Cognitive overload indicates the need for more time. Emotional stress or loss of efficacy may suggest the need for greater support.

Additionally, the model suggests that complex solutions are needed to address the stubborn problem of educator cognitive change. The literature often highlights educator resistance and the policies, levers, and conditions needed to overcome it. A frequent suggestion is to provide *more* of some policy, lever, or condition. Successful change involves a complex web of factors that all must occur, some of which may be controlled by policy and others which cannot. There is no single policy, program, or process that can make a significant impact on individual change.

Educational Leadership Preparation Programs

Educational leadership preparation programs often equip candidates to become transformational leaders. Some courses emphasize the process of how change occurs—in individuals as well as organizations. Others focus on the role of the leader in encouraging and supporting change. This study has implications for both what is taught about leading change and how it is taught.

Educational leadership preparaton programs can use the educator cognitive change model to prepare future leaders to plan for and manage change. Together, the

verbal description and the visual representation of the cognitive change model provides a theoretical as well as practical perspective of cognitive change at the individual level. As a theoretical foundation, it serves as a lens through which educational leaders understand and interpret the meaning perspectives of educators. The model also provides guidelines for leaders to plan for and to analyze change.

This model may help educational leadership programs instill leadership behaviors conducive to effecting change within an organization. Program standards typically require candidates to employ behaviors related to collaborative, distributed, and shared leadership. For many, a distributed view of leadership requires a shift in their meaning perspective. As Brunner (2002) noted, educational leaders commonly adopt the language of shared leadership but not the actions. This research suggests that educational leadership preparation programs can utilize this cognitive change model in planning for the necessary leadership meaning perspective change. The anlaysis of the individual cases provides evidence that such a shift may be more likely if the leadership candidates actually experience the differing leadership styles rather than merely discussing them. Furthermore, Experiential Simulations© may be a useful tool for preparing future educational leaders.

Future Research

Since this study provides a model for examining educator cognitive change, researchers interested in studying the phenomenon of cognitive change and developing studies to address the same, now have a framework to guide their work. The model provides a theory with assumptions that can be tested in training programs.

Importantly, this model highlights the intersection of knowledge across various disciplines, suggesting possible means for collaboration. Educators, neuroscientists, and psychologists might cooperate together to further untangle and identify the factors that encourage or inhibit educator cognitive change. Educators may explore how automatic processes can be actively recruited to frame cognitive change and minimize disorientation. Neuroscience studies can confirm whether the suggested neural processes are involved as indicated by this model. For example, an fMRI study can examine neural mechanisms active when educators receive information that is either consistent or inconsistent with their existing meaning perspective. The neural data can be compared with participants' interpretations of the information.

The cognitive change model suggests that a cognitive cue is vital for initiating the change process. Neuroscience studies distinguish between cues caused by conflict (dACCP and by error (rACC). The two participants that changed were cued by error. Are cues caused by errors more likely to spur change than cues caused by conflict?

The applicability of the educator cognitive change model should be further tested. Researchers should gather data from other types of educator development to learn the extent to which the model applies more broadly. In this study, the model was only applied to six cases. Using this model to interpret the cognitive change experiences of more cases will check its broader usefulness. Additionally, researchers can create new programs of educator development based upon this model and test those programs' effectiveness.

The model itself should be tested and refined. Some aspects of the model could not be fully explored. The literature discusses the importance of external capacities like

time, collaboration, and support, but the supporting evidence in this study is thin. ES© was not designed to capture those elements. Moreover, time may simply be a function of the other internal and external factors. The time needed for change will vary depending on how long it takes an individual to acquire sufficient knowledge and other capacities. Should these capacities not be available, no time would ever be enough.

Further, it is not known whether all the internal or external capacities needed to support cognitive change are identified. Stanovich and West (2008a) suggest that cognitive decoupling is a necessary internal capacity, but this study lacked the ability to provide evidence in support of their claim. Additional studies can explore how well-correlated the model's identified capacities are with cognitive change.

This study also suggests that the ability for ES© to influence cognitive change might be enhanced by expanding opportunities for collaboration within the chat environment on topics of power, identity, and leadership. Currently, participants collaborate on the assigned leadership task and reflect privately on power, identity, and leadership. Enabling participants to process their ideas about those concepts with one another in the chat space could cause them to examine and defend their thoughts. This would allow participants to learn from one another as they process their experiences, thereby enhancing change.

Limitations

There are several limitations to this study that should be noted. First, this study is restricted by the researcher's limited understanding of cognitive psychology and neuroscience literature. The researcher's native discipline is education. Using a transdisciplinary approach requires going beyond one's native discipline to bring

research from other disciplines to bear upon the problem (Varma et al., 2008). However, this also carries a risk that the researcher has not spent sufficient time immersed in other disciplines to gain insight.

Another limitation is the researcher's own bias. I spent many months preparing for this study by reading theoretical literature and research studies related to the topic. Although every attempt was made to allow the qualitative data to give rise to the findings, the conceptual framework as suggested by the literature framed my understanding and influenced my expectations. While trying to prevent the framework from being the funnel into which the data must be poured, it is possible that my analysis is influenced by the expectations of the literature. Future research should be alert for disconfirming data.

This study is only intended to create a transdisciplinary model of educator cognitive change and to apply it using a secondary analysis of data collected in a specific type of educator development using Experiential Simulations (ES©). This setting involves graduate students in educational leadership courses using ES© as a reflective tool. This setting was chosen because of its potential to produce the kind of data necessary to create and apply a transdisciplinary model. Therefore any conclusions only pertain to that type of educator development. To provide in-depth analysis of data, the study focuses on only those cases that provide some evidence of cognitive change processes. This study is not intended to analyze every instance of educator change that is possible. Due to the unique nature of the setting, results may not be applicable to other types of educator development.

Another limitation is that this study is bounded by the time and parameters of the ES©. All data were gathered during the one-month period of the online portion of the course. Participants were asked to reflect upon—and comment on—only events occurring within the course itself. The researcher was limited to participant responses during this time and about the given topics. Contributing experiences beyond the ES© were unknown unless a participant offered such information. In most cases, participants provided little data regarding either conditions of support or opportunities to discuss issues of power in the real world. So even though support for and collaboration about a change are important external factors indicated by the literature, there was little information on either within the data. In addition, time was limited to the four weeks—preventing continued study of participants for whom change seemed likely. The participants were part of a course, and the data they provided was part of a participation grade. This likely shaded some of their answers. Two participants openly wondered whether their negative answers or refusal to answer would impact their grade.[2]

The study was further limited to the number of cases examined. In order to allow in-depth analysis of their individual experiences, six cases were identified based upon the selection criteria—three most likely and three least likely to experience cognitive change. The selection criteria proved somewhat unreliable. The actual experiences of participant change were inconsistent with the evidence gleaned from the three, four-hour chat transcripts. Other or additional cases may have been more useful.

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[2] It was made clear to course participants that any participation grade that was given was awarded *before* the instructor knew the participants' names. Identities were kept by a research assistant and not given to the instructor until months *after* the online work was completed and participant grades were already awarded and recorded.

This study is also limited because the data was gathered ten years before this analysis. The researcher was unable to contact any participants to confirm whether interpretations were correct. The researcher was also unable to conduct follow-up interviews to inquire about the opportunities for collaboration, the support of the work environment, and the influence of time—topics that were not the focus of any reflection questions.

Due to the above limitations the reader is cautioned against generalizing the results to other educator cognitive change situations. More study should be done in other settings to determine the reliability of this model in describing educator cognitive change.

Epilogue

An old dog will learn no tricks.

- Nathan Bailey, 1721

I return to the well-known proverb that introduces this study. The saying implies that efforts to help adults undergo a cognitive change are futile. This study, however, suggests that the roots of cognitive change are embedded in the normal neural processes which govern the daily navigation of life. Resistance to change is only a symptom that the necessary conditions to support those neural processes do not exist. Given support, cognitive change is not only possible, but likely. In that there is hope, for it suggests that with proper intervention, even an old dog can learn new tricks.

Indeed, the cognitive change model has guided my recent work with educators. I have designed and taught a one-credit, online course based upon the model's principles with promising results. The model guides my work as a change agent in my larger

educational system. To that end, I use a blog as a tool to provide necessary factors to support cognitive change among a diverse population. The blog enables me to provide cues, new knowledge, and a safe platform for discussion. Initial indications suggest some important shifts are beginning to occur.

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APPENDIX A: INTERVIEW ANALYSIS THEMES AND DEFINITIONS

Anomaly: A surprise. Indicates that something - an event or expression by someone - has occured that is unexpected or doesn't fit what the participant considers to be the normal pattern. May create a conflict and disorientation, but does not need to.

Attitude – emotion

- **Anger:** The participant expresses animosity towards someone, the situation, the course, etc.
- **Annoyance:** irritation with others is evident. Does not rise to the level of anger.
- **Blaming:** The participant places the cause of one's inability to succeed, feelings of frustration, or lack of ability to control the situation on someone or something other than oneself and one's own behaviors or inabilities.
- **Confidence**: The participant expresses a certainty in the current or future success of a situation.
- **Frustration:** The participant is exasperated, or feels that he or she cannot control the situation and has no ability to or plan to resolve the situation.
- **Joy-excitement:** The participant's words reflect a sense of happiness, joy, optimism, or exhuberance.

Background knowledge for problem solving: The participant relates a plan, or a conception of a plan, to solve a problem by relating the experience to a previous one or to a previous training. The participant perceives the new situation to be either identical or similar to what has been previously learned or experienced. May use the previous problem solving strategy or experience to interpret or solve the present dilemma.

Cognitive Conflict Evidence: Expressions signify that the individual is undergoing a conflict in thought between what one expects to occur and what actual has occurred, or a conflict in the way the person believes things should be and the way things are.

Disorientation – Loss of sense-making: The participant indicates that he/she is confused, is unsure how to interpret what has occurred or how to respond. The environment is one which does not respond as expected.

Efficacy: The participant’s conception of the degree to which one has the ability to exert a measure of control over the situation's outcome. The participant believes that his/her efforts and results are positively related. “The more effort, the greater the results.”

- **Negative Efficacy:** The participant experiences either a loss or absence of the ability to exert control over one's experiences, and that further effort is unlikely to result in any change of the status quo.
- **Positive Efficacy:** The participant indicates he or she has a measure of control or that effort will result in positive results.

Identity: The aspects of one's identity (race, gender, culture, occupation, SES, etc.) that contribute to one's evaluation of oneself or others and one's ability to influence**.**

- **General conceptions of identity:** Identity as it relates to others or to people in general. **Self-perception of identity:** One's perception or sense of one's own value or influence due to gender, occupation (title), race, culture, etc.

Influence: The ability or inability to have an effect upon the thoughts, words, and actions of others.

- **Perception of others' influence:** The way one sees other's ability or inability to have an effect upon others' thoughts, words, or actions.
    - **Exerting influence – others' ability:** perceives that others are able to influence the thoughts, words, and actions of oneself or others.
        - **Negative influence – others:** sees others as exerting a negative, unhealthy, or nonproductive dynamic and hinders the work of others.
        - **Positive influence – others:** sees others as exerting a positive or productive impact that enhances the work or attitudes of others
    - **Lack of influence – others' ability:** perceives that another is unable to have an effect upon one's own or others' thoughts, words, or actions.
- **Self-perception of influence:** Expresses the ability of and/or the degree to which the participant influences others in the group.

Leadership: An articulation of the characteristics or qualities necessary to take on the role of leader.

- **General conception of leadership:** Demonstrates a conception of the qualities and characteristics that define the leadership of others or the population in general.
- **Self-perception of leadership:** How the participant views one's own characteristics or qualities that serve to guide or lead others.

Openness-willingness to change: Comments display an openness or willingness to consider other viewpoints or perspectives. Also shows an honesty in assessing one's own perspective, with a consideration that one's own perspective may not fully explain a given experience or phenomenon.

Power: A relational concept that refers to the ability of one or several to influence or accomplish a task without resistance.

- **Power over:** "Power conceived as dominance, authority, control, influence, or power over others or things" (Brunner, 2002, p. 696).
- **Power with/to:** "The capacity to accomplish certain social goals through cooperation among people or groups with various interests and concerns" (Brunner, 2002, p. 699)

Reflection: The participant indicates he or she is thinking about what has occurred and attempting to sort it out. The participant may be considering alternative ways to

respond. Reflection may involve metacognition. The participant may also demonstrate a level of insight that goes beneath the surface to consideration of the underlying dynamics.

Resistance: The participant expresses an unwillingness to consider alternatives or to reinterpret the situation. Refuses to acknowledge that one's own thinking or actions may be incorrect. May believe that others need to change or do things differently, not oneself. Resistance is the opposite of openness.

APPENDIX B: REFLECTION QUESTIONS MOST USEFUL FOR QUALITATIVE DATA ANALYSIS

Subject Power and Identity Set #1

1. What are your reactions to, concerns about, observations about, thoughts about working with a group of people who have no identifying characteristics other than written text in a chat room?
2. Have you imagined how others in the group look, who they might be, what they might do in life? If so, what do you imagine? (Use the transcript to help answer this question. Refer to individual IDs when you describe others.) If not, what does your mind do instead?
3. Did the lack of identity affect the Task Force work that has to be accomplished?
4. What do you think you need to know about the others? Why do you need to know each of these things?
5. What do you feel you want to know about the others? Why do you want to know each of these things?
6. What do you think others need to know about you? Why do they need to know this?
7. What do you feel others want to know about you? Why would they want to know this?
8. Describe the group dynamics of Session One.
9. Which person or persons in the group seems to be the most directive? Support your conclusions.
10. Which person or persons in the group seems to be the most influential? To the positive? To the negative? Support your conclusion.
11. What role did you play in the work session? Describe it. Support your conclusion.
12. Were you satisfied with the role you played during the session? Why? Why not?
13. How did others in the group react to you and your contributions? Do you think you would be named as influential and/or directive?
14. Did this group react to you the way other groups react to you? Describe the difference. If there is a difference, try to explain why this happened.
15. Is there something about you that makes others respond to you differently in other groups where identity is not masked?
16. Please make any additional comments; suggestions; contribute ideas; pose questions.
17. What did you learn about yourself from Session One that surprised you?

Subject Task Force #1

1. In any decision making process, what do you think is most important?
2. Will you get ready in some way for the next Task Force session? What will you do?
3. In your opinion, how did Session One go? Explain.
4. What do you want to happen in Session Two? Why?
5. What will you do differently in Session Two? What will you do the same?
6. What are your concerns about the group process?

POWER AND IDENTITY QUESTIONS SET #2

1. Look at your answer to the second question in Questions Set #1. Were you surprised by the photos? What surprised you? Was your imagination correct?
2. Will the photo identities affect the Task Force work in any way? If so, how? If not, why not?
3. Do the photos make you curious about the people in the group? What do you want or need to know now that you have seen the photos?
4. Are you curious about any particular person because of the photos? Which one and why?
5. Think about how you are reacting to the photos of others. How do you think the group is reacting to your photo? What might they be curious about?
6. Which person or persons in the group LOOKS the most directive? Support your conclusion. Is this (Are these) the same person or persons you named in answer to question nine in Questions Set #1? Support your answer.
7.Which person or persons in the group LOOKS most influential? To the positive? To the negative? Support your conclusion. Is this (Are these) the same person or persons you named in answer to question nine in Questions Set #1? Support your answer.
8. Do you think you would be named as influential and or directive because of your photo? Why or why not?
9. Is there something about you beyond what you write in the chat room and the way you look that you want and/or others to know about you?
10. Please make any additional comments; suggestions; contribute ideas; pose questions.

TASK FORCE QUESTIONS SET #2

1. Now that you have been through a process of decision making with the Task Force, please answer this question again: In any decision making process, what do you think is most important?
2. Will you get ready in some way for the next Task Force session? What will you do?
3. In your opinion, how did Session Two go? Explain.
4. What do you want to happen in Session Three? Why?
5. What will you do differently in Session Three? What will you do the same?
6. Do you have any new concerns about the group process?
7. Is your participation in the group process real or contrived? Do you have any rules or guidelines for your own behavior during group decision making?

POWER AND IDENTITY QUESTIONS SET #3

1.What are your reactions to, concerns about, observations about, thoughts about working with a group of people who have no identifying characteristics other than written text AND photos in a chat room?
2. Did the addition of photo identity affect the Task Force work? How?
3. What do you need or want to know about the others now? Why do you need or want to know these things?
4. Are there particular people whom you need or want to know more about? What do you need or want to know and why? Why not?

5. What do you need or want others to know about you that you don't think they know yet? Why do they need or want to know these things?
6. Describe the group dynamics of Session Two.
9. Describe your own leadership style. Do you think others in the group will agree with you? Why or why not? What do you think they will say about your leadership style?
10. What role did you play in Session Two? Are you playing a different role than you did in Session One? Why or why not? Support your conclusion. Describe the role.
11. Were you satisfied with the role you played during the session? Why? Why not?
12. Do you have any thoughts or feelings (negative or positive) related to your influence or the influence of others?
13. How did others in the group react to you and your overall contributions during Session Two?
14. During Session Two, did the group react to you the way other groups react to you? Describe the difference. If there is a difference, try to explain why this happened.
15. Please make any additional comments; suggestions; contribute ideas; pose questions.
16. What did you learn about yourself from Session Two that surprised you?

Power and Identity QUESTIONS SET #4
1. What are your reactions to, concerns about, observations about, thoughts about the video clips of the others in the group?
3. Do you think that hearing these voices will affect the Task Force work during Session Three? Why or why not?
9. Please make any additional comments; suggestions; contribute ideas; pose questions.

TASK FORCE QUESTIONS SET #3
1. Now that you have been through a process of decision making with the Task Force, please answer this question again: In any decision making process, what do you think is most important?
2. Will you get ready in some way for the next Task Force session? What will you do?
3. In your opinion, how did Session Three go? Explain.
4. What do you want to happen in Session Four? Why?
5. Do you have any concerns about the Task Force meeting face-to-face?
6. Do you have any new concerns about the group process?
7. What is your view of group participation? How has the Task Force done in regard to participation? How are individual's (identity them by IDs) doing with group participation?

Subject Power and Identity QUESTIONS SET #5
1. What are your reactions to, frustrations and/or concerns about, observations about, thoughts about this new photo that has represented you all along? What don't you like about your pseudo photo? Why? What do you like about it? Why?
2. Did you know that you were being represented by (and that others in the group were seeing) a photo that really isn't yours? If so, how did you know? Did knowing make a big difference to you? Why or why not?

3. Do you think the pseudo photo of you affected the way others reacted to you in the chat room? Why or why not? Support your answers with some evidence (review transcripts).
4. Were the reactions of others to you (portrayed by your own written text and a pseudo photo, video, and sound clip) during Task Force work unusual as compared with other reactions you have had in the past from people in classes or groups? If so, identify whether they are positive or negative and how are they different. What has created these differences, in your opinion?
6. Try to recall the first thing that came to your mind when you saw your pseudo photo. Write about it.
7. If you could announce, right now, something you think is important to the entire class what would it be?
8. What has surprised you about this most recent revelation?
9. Please make any additional comments; suggestions; contribute ideas; pose questions.

Power and Identity QUESTIONS SET #6
1. Describe your reactions to Session Three: Part I–reactions to the Task Force work while you were represented by your pseudo identity. For example, how was your experience different since you knew about your pseudo identity? Support you answer.
2. Describe your reactions to Session Three: Part Part II–reactions to the last part of the session when all real identities were revealed.
3. What do you need or want to know about others in the group now that you have seen a real photo of each of them?
4. What do you want the others to know about you now that they have seen your real photo?
5. Describe the group dynamics of Part I of Session Three.
6. Describe the group dynamics of Part II of Session Three.
7. Which person or persons were the most influential during Part I of Session Three? To the negative? To the positive?
8. How would you describe your role overall during the first three sessions of class. Do you think this role will change when you meet face to face during Session Four?
9. How did others in the group react to you and your contributions during Session Three? Was there anything different in terms of reactions to you during Session Three? What were these things? What do you think created this difference?
10. Did you as a group accomplish what you thought should be accomplished? Why or why not? What else do you think should have been accomplished?
11. How would you have organized the Task Force work if you could have? What difference would your plan have made for the project? Support your answer.
12.Write a short paragraph about your experience of the first three sessions of class. Include a list of surprises and a list of your strongest learnings.
13.Write a paragraph about how your learnings relate to the course content and purpose. Include how you will apply these learnings to your personal and professional life.
14.Please make any additional comments; suggestions; contribute ideas; pose questions.