A Study of Complex Leadership Theory in a Title One Middle School
During the CoVID-19 Outbreak of 2020

By

Elizabeth Anne Parker

A dissertation submitted to the Graduate Faculty of
Auburn University
in partial fulfillment of the
requirements for the Degree of
Doctor of Philosophy

Auburn, Alabama
August 5, 2023

Keywords: COVID-19 pandemic, Complex leadership theory, Educational disruption, Complex
adaptive systems, Leadership functions analysis

Approved by

Ellen (Reams) Hahn, Chair, Professor of Educational Foundations, Leadership and Technology
Francis Kochan, Professor Emeritus of Educational Foundations, Leadership and Technology
Elena Aydarova, Assistant Professor of Educational Foundations, Leadership and Technology
Jason Bryant, Associate Clinical Professor of Educational Foundations, Leadership, and
Technology

Abstract

The COVID-19 pandemic caused worldwide disruption, including the closure of public schools in the United States. This dissertation introduces a conceptual framework of complex leadership, based on complexity leadership theory, to understand the decision-making process of traditional leadership positions. The framework identifies five leadership functions: generative, administrative, community building, information gathering, and information using. These functions interact within a closed complex adaptive system, facilitating emergence, self-organization, and adaptation.

Applying this framework to education during the pandemic, the study reveals that the education system operates as a complex adaptive system, with leadership events occurring in a chaotic environment. The closure of schools and the shift to virtual learning created uncertainty and disagreements among stakeholders, exacerbated by internet access issues and insufficient training. The formation of groups, called aggregates, was influenced by shared experiences and connections. High staff turnover and organizational issues hindered the formation of strong relationships among teachers.

The study finds that the GMS school operated in a state of chaos during the pandemic. Aggregates formed to address challenges and find solutions. The study examines the administrative, generative, and community building functions of complex leadership and highlights the importance of building meaningful relationships, balancing generative and administrative functions, and supporting communication.

The study concludes that complex leadership theory is applicable to chaotic educational environments during the pandemic. It suggests further research to intentionally implement the theory and explore relationships and emergent leadership events in other educational contexts.

Additionally, the formation of aggregates and their response to the administrative function

should be studied from an insider's perspective.

Acknowledgements

I would like to express my deepest appreciation to the chair of my committee, Dr. Ellen Hahn, and my co-chair, Dr. Elena Aydarova, who have been more than academic advisors but also personal cheerleaders and friends. I am also extremely grateful to my other committee members. Dr. Frances Kochan, Dr. Jason Bryant, and Dr. Stewart Whittemore, for their advice and precious time.

I could not have completed this work without the help and support of my family: my husband, Dave, for his constant encouragement and my children, Charlotte, Philipa, Olivia, and Joshua, thank you for helping with the washing and cleaning while Mommy was writing.

I cannot begin to express my thanks to my cohort who have been invaluable as mentors but especially as really good friends. Thank you, Dr. Brandy Howard, Dr. James Slear, Dr. Linda Summerlin, and Suzanne Dickinson (you are next). To my friends who have smiled, nodded, and listened and not (intentionally) fallen asleep as I told them about my research (again), Mr. Fred Maynard and Mr. Grant Smith, thank you for your candid advice.

I would also like to extend my sincere thanks to the fabulous administration and faculty at GMS: I am also immensely grateful to the brilliant faculty at MCPS including Mrs. Eileen Aaron, Mrs. Sinead Turner, Mrs. Jeanne Crenshaw, Mrs. Sarah Berg, Mrs. Kerri Moore, Hank J. Helmman, and Mr. Justin Castanza for their support and prayers. Also, my deepest thanks go to the lovely Angela Garrett for catching all my mistakes.

This dissertation is presented in memory of DeAnthony Vickers.

Table of Contents

List of Figures

Chapter 1: Introduction

On the last day of 2019 and after much speculation, the government in Wuhan Province, China, confirmed it was treating dozens of cases of a pneumonia-based disease which had an unknown cause (Taylor, 2020). The Chinese authorities identified a new type of coronavirus on January 7 which was subsequently to be named 2019-nCoV or more popularly COVID-19 and shared the genetic sequence with the world on January 12 (World Health Organization, 2020a). The previous day, January 11, 2020, China had reported its first death from the virus, a 61-year-old man, who was a regular visitor to the Huanan seafood market in the Jianghan district of Wuhan. At that time, China reported that there was no evidence that the virus could be spread between humans (Qin & Hernandez, 2020). The death came just a few weeks before China's largest national holiday, the Chinese New Year. This is traditionally a time of family reunification, where the entire Chinese economy closes for the statutory seven-day holiday and citizens make over three billion trips to see family and friends (Lyu et al., 2020). The government put the city of Wuhan on lockdown on January 23, one day before the beginning of the holiday, halting all public transport and canceling all flights, but the disease had begun to spread.

The Ministry of Public Health in Thailand reported its first case of the virus on January 13, 2020, the Ministry of Health, Labor and Welfare in Japan (MHLW) reported its first imported case on January 15, and the National Focal Point (NFP) for the Republic of Korea reported their first laboratory confirmed case on January 20 (World Health Organization, 2020b). By January 23, at least seventeen people had died and more than five hundred seventy were infected including now Taiwan and Washington State in the United States (Rabin, 2020). On Thursday January 30, the World Health Organization declared a global health emergency, as the infection

11

rate worldwide hit nearly ten thousand. The first death outside of China was reported in the Philippines on February 2, a man in his forties who had traveled directly from Wuhan (Ramzy & May, 2020); by this date, three hundred sixty people had reportedly died in China.

On February 11, the WHO gave the disease its official name (WHO, 2020), but in a supporting press conference, the director general of the World Health Organization, Tedros Adhanom Ghebreyesus stated, "With 99 percent of cases in China, this remains very much an emergency for that country, but one that holds a very grave threat for the rest of the world" (Ramzy et al., 2020). By March 11, the US suspended travel from Europe and the rest of the world (Baker, 2020), and on March 12, Michigan became the first state to close its public schools, with all but two states (Nebraska and Maine) closing all their public school buildings within eleven days (Marshall et al., 2020).

Purpose and Rationale

The twenty-first century globalization, underpinned by super government and non-government powers (Tilly 2004), fueled a global movement of education and money rooted in the production of easily transported electronics and pharmaceuticals. Harvard Business News predicted a 13-32% decline in merchandise trade (Altman, 2020) due to the COVID-19 pandemic. This is unlikely to be the last global pandemic which closes schools across the world and globally forces governments to impose restrictions on international travel. As the advantages and benefits of trade and travel and the possibilities of global education reach the children in the wet markets in central China, the detrimental effects of epidemiological diffusion accompany them. The rapid spread of COVID-19 wreaked havoc on every aspect of life. Governments struggled with a massive economic downturn while millions of people stayed at home to protect themselves from the virus. There were massive and long-term economic consequences for both

12

non-governmental and governmental organizations (Altman 2020). Perhaps more significant, however, are the effects of schools across the United States suddenly closing, and their teaching and instruction moving rapidly to untested online platforms. The consequences of these actions will not be apparent for another generation, and the true cost cannot be calculated.

Change management, especially within emergency situations like the COVID-19 outbreak, became critical. The globalization of the post-world war II era (Tilly, 2004) changed its focus, and the previous increase in personal travel and commerce reversed (Altman, 2020). How individual communities reacted to these changes and responded to a global crisis became increasingly important. Nontraditional leadership emerged as a significant role over traditional leadership positions as communities found themselves having to quickly adapt to new situations. New transitions became more dialogue based rather than instructional as people attempted to find a new normal.

Within the uncertainty of changing environments, researchers have developed ways to predict, measure, and understand community behavior. Complex Adaptive Systems (CASs) are groups and organizations where an understanding of how the individual components operate is not a direct predictor of how the whole will react to a situation. There is an element of circumstantial unpredictability that cannot be fully understood until after the event has been observed. The system is an evolving structure which reorganizes and adapts according to the unique environmental conditions of the moment (Chiva, 2014, as cited in Turner & Baker, 2019; He et al., 2011; Manson, 2001; Morrison, 2006; Stacey, 1996; Stewart 2001).

Viewing communities as Complex Adaptive Systems (CASs) is a way to view groups of people who are isolated in a semi permeable way, within a larger community and to describe the interactions between individuals and groups. My example is Gregory Middle School (GMS), a

Title I middle school in the Southeast of the United States. GMS has a minority population of 94% and 84% of the population are economically disadvantaged. GMS is part of McMillan Public School District (MPS) which serves approximately 28,000 students in 52 schools. I have used MPS and GMS as pseudonyms to anonymize the school system and school throughout this dissertation.

Statement of the Problem

Preparing for and managing change is an area of intense research in business leadership academia, and if this is true for business and commerce, it is doubly true for schools and education. How, then, do leaders of communities, like school districts, handle a massive change that was totally unpredictable and groundbreaking in its consequences? What can we learn about community interaction and leadership roles during radical change? While complexity leadership theory, using complex adaptive systems as the central tenet, have been developing for some time in other fields, educational references to this theory are not as fully developed. Complexity leadership theory has been studied in a school leadership environment (Morrison, 2002) but not through a case study and not in an environment identifying a specific community and the theory together. This case study of an educational community, undergoing massive change and uncertainty and using complex leadership theory as its conceptual framework, examined these questions and the implications for school communities and their traditional administrative leadership roles.

Purpose of the Study

This is an instrumental case study (Stake,1995) to show how a semi-isolated school community handled the change from traditional classroom-based school to virtual school in a short amount of time due to the COVID-19 outbreak of 2020. It explores how this radical social

adjustment for the community shaped individual interactions with the school administration and each other during this time. It proposes that these interactions within the community can be better understood using a framework built on complexity leadership theories (Morrison 2002).

Conceptual Framework

Complexity leadership theory has developed from complexity science where systems are described as non-linear and non-reductionist (Chiva, 2014, as cited in Turner & Baker, 2019). Leadership is described in terms of events and is not assigned to an individual person or group. The unpredictable interactions of individuals described in complex leadership theory (CLT) fits well within an educational community environment where there are many diverse stakeholders who all have distinct and individual needs from the system. I have combined several structural frameworks from the literature, which are not from an education leadership discipline, and created a theoretical framework of complexity leadership. Understanding the complexity of a system and the interactions between the individuals involved is a matter of perspective or framing and the level of decision making that it influences, referred to as fine and coarse grain activities (Stewart 2001). While some interpretations of the theory attempt to capture the chaos of the interactions (Gilani et al., 2018) and others try to move away from the over simplistic reductionist logic (Uhl-Bien & Marion, 2009), my conceptual framework uses observations and interviews to examine the influence that the relationships and interactions throughout the community have on the decision-making processes of those in traditional leadership positions.

The conceptual framework I developed based on the literature and personal experiences guides the selection of participants, the data collection strategies, and the development of the codebook for data analysis as described by Miles and Huberman (1994). The conceptual framework identifies who is included in the study, describes the relationships that present

themselves, and identifies areas for coding and general constructs that can be put into intellectual "bins" (Miles & Huberman, 1994, p. 18).

Research Question

How did the decision-making processes of traditional leadership roles change through the interaction of the four functions of complex leadership theory in a Title I middle school, in response to the COVID-19 crisis?

Research Design

This is an instrumental single case study (Stake, 1995) to show how a semi-isolated school community handled the change from traditional classroom-based school to virtual school in a noticeably short amount of time due to the COVID-19 outbreak of 2020. Through a process of semi-structured interviews and observations, the study explores how the school and district administration structures changed their decision-making processes to accommodate the influences of the community. These changes in decision-making processes and the interactions that influenced them are modeled using a framework built on complex leadership theories.

An instrumental design is one which uses a case study to understand a process, rather than the case itself; in this case, leadership in complex changing environments is the process examined (Stake,1995), remembering that the generalization comes from the case study and not the case (Yin, 2006). Unlike other case studies that attempt to explain the situation, this study provides understanding of the functions involved in the decision-making process. Understanding relates to an intentionality which explanation is not. This case study does not work to explain why things were the way they were rather it describes in depth how things were at a particular time and place (Stake, 1995). This is different to case studies seeking to identify cause and effect

relationships and those, like this study which are seeking understanding of the human experience.

Assumptions

While I am studying the impact of a global pandemic on local decision making, I have bound this case by focusing on a specific community. I assume that parents, teachers, and paraprofessionals within the community made contributions to the decision-making process of the administration during the lockdown period. I assume that parents wrote emails to the school leadership expressing their concerns and their observations of their own students and made suggestions about policy. I assume that parents, teachers, and paraprofessionals in the school community talked to each other about their concerns and these interactions helped to solidify opinions and promoted the idea of communicating their ideas. Subsequently, the school leadership or the school district made a decision that changed the coarse grain policy the group were discussing.

Delimitations

This is a bounded system both spatially and temporally. The time limitation of this study was from the lockdown announcement by the state governor (26 March 2020) to the end of the academic year for the students (June 10, 2020), a total of seventy-six days, not all of which were designated school work days. The people included in this study are members of the GMS community. The members of my defined community all live in the local area of a medium sized city in the South Western United States.

Significance

The post World War II (1945) globalization of commerce accompanied by globalization of movement of people (Tilly, 2002) was severely affected by the outbreak of COVID -19. This

is unlikely to be the last global pandemic which closes schools across the world. Generally, world economists view the prospects for globalization in a post Coronavirus era as being economically and politically driven (Altman, 2020) but few have considered the effects on a generation of young people through their educational experience and the changes that took place in schools during the pandemic. They admit that the decision-making process in a changing environment, especially when that change precipitates an unpredictable emergency situation, becomes critical (Sridhar & Majumder, 2020). They acknowledge that nontraditional leadership takes precedence over traditional dictatorial roles as bringing communities into compliance becomes more dialogue based rather than instructional (Taub, 2020), but few have applied these assertions to educational situations.

Viewing educational communities as Complex Adaptive Systems (CAS) is a new way to view groups of people who are isolated in a semi permeable way, within a larger community. Every member of the community has a stakeholder role within the system and therefore becomes an aggregate as they communicate with other members. Understanding how a high school community operates as a complex adaptive system in extreme circumstances can help us better understand leadership and school communities for the future.

Definition of Terms

Complex Leadership Theory (CLT): There is no single definition or acknowledged theory for complexity leadership. Arising from scientific complexity theory complexity leadership theory is a leadership system where systems are described as non-linear and non-reductionist. CLT provides a theoretical framework for explaining the social interaction of individuals within a system that many other leadership theories have acknowledged but not fully developed. This

view of leadership embraces enabling and learning rather than chasing desired outcomes and controlling the behaviors of followers

Complex Adaptive System (CAS): There is no single definition for complex adaptive systems (CASs). They cannot be reduced to their component parts as the total sum of the output of their properties is not linearly related to the individual elements. The result of a complex adaptive system does not follow a reductionist theory and instead depends on the interdependency and interactions of the components (He et al., 2011, as cited in Turner & Baker, 2019). The systems are always heterogeneous in nature and theoretically are unlimited in their ability to adapt and change (Chiva, 2014, as cited in Turner & Baker, 2019). The complex adaptive system is the basic unit of complex leadership theory.

Organization of the Study

This study was organized into five chapters. In chapter one, the researcher determined the purpose of the study, explained the problem and significance, provided the relevant literature. The research questions were introduced and a brief overview of the study design, along with the conceptual framework that guided the study was presented. In chapter two, the researcher defined and developed a theory of complex leadership and identified the relevant leadership functions and mechanisms. In chapter three, the researcher offered a reflexivity statement, explained the research methodology and rationale, and detailed the research design by outlining the bounds of the case and the epistemological commitment of the study. Chapter three also included strategies for trustworthiness, validity, and ethical considerations. The results were presented in chapter four. Chapter five included an interpretation of the results, highlighted important implications, and recommended areas for future research.

Chapter 2: Literature Review

"The leader is one who, out of clutter, brings simplicity… out of discord, harmony… and out of difficulty, opportunity." - Albert Einstein

Educational Leadership Theories

Discussions of what makes a good leader have filled the pages of journals and articles for decades. Many academics have spent a lifetime of research seeking a theory that will provide a structure for all leaders in all situations. In assessing the characteristics of effective schools, researchers have developed many lists and instruments which have differing amounts of influence. Quality indicators have been developed alongside these lists, and leadership is featured every time (Christie & Lingard, 2001). Educational leadership theories have followed general leadership theories adapting the specifics, as necessary.

There is considerable research to show alternatives to traditional hierarchy in schools including parallel leadership (Crowther et al., 2002), density of leadership, and building leadership capacity in schools (Lambert, 1998). All of these theories try to capture the notion that leadership goes beyond an individual endeavor but never fully abandons the traditional role structure.

Leithwood and various colleagues have developed and described in detail an eight-dimensional model of transformational school leadership (Leithwood & Jantzi, 1990, 1999, 2000) following the general leadership theory with details for educational settings. Yukl and Mahsud (2010) discuss the need for flexible and adaptive leadership in the commercial world citing increased use of virtual interaction and new forms of social networking, and what is true in a business environment is doubly true for education. In fulfilling the much-quoted brief of every high school to "prepare students for jobs that don't yet exist … using technologies that haven't

been invented … in order to solve problems we don't even know are problems yet" (Fisch, 2006), education must be at the front of the practice of adaptive leadership and be aware of changes in leadership theory.

Complexity Leadership theory (CLT) has emerged in response to the issues and limitations of existing leadership theories (Brown, 2011). It reframes leadership as no longer referring to a person but instead to an event (Goldstein et al., 2010). It is a distributed theory where anyone within the system can, and does, act as both a participant and a leader at any time. Traditional leadership still exists to facilitate the events that emerge from systematic interactions (Lichtenstein et al., 2006), but the events are created throughout the system from many heterogeneous agents.

Scientific Complexity Theory

Since the seventeenth century and the work of Sir Isaac Newton, the scientific method has orientated itself around a reductionist linear theory, concluding that a system is the sum of its parts, and if the parts are understood in enough detail, the whole becomes clear. This epistemology has been successfully applied to many areas and has provided the scientific community with reliable and dependable answers for centuries. The rocket that took man to the moon was a linearly organized, reductionist sum of the engineered parts from which it was constructed. As understanding has progressed however, scientists have become aware of systems which are not linear and cannot be reduced to the sum of their parts…systems in which the total product turns out to be much more than that calculated by simple addition. These systems, which are unpredictable and mercurial, are defined as complex. A complex system is not the same as a complicated system. Complicated systems have many parts and have many influences but can still be described using linear and reductionist theories.

An ecologically diverse rainforest, the daily commute to work through city traffic, the stock market and national economic movement, and our individual immune systems are all examples of adaptive systems that exhibit complexity, otherwise known as CAS. Figure 1 is an amalgamation of several diagrams (Rumsfeld 2002; Snowden, 2010; Turner & Baker, 2019) and shows four types of systems divided into two main categories. The traditional view, represented by general systems theory (GST), which bases itself on the principle of equilibrium or homeostasis (Schneider & Somers, 2006), employs reductionist and linear theories. The simple example is a bicycle where the interaction of the component parts can be seen and easily understood, and the complicated, a space rocket, in which the mathematical mechanics are intricate but still linear. On the other side is the complex view, where complex adaptive systems do not produce linear results and are non-reductionist in nature. The difference between complex and chaos is highlighted in that chaotic systems are unknowable, but complex systems emerge into coherence that can be seen with retrospect.

Battram (1998) refers to chaotic systems as crudely complex, showing a potential for complexity, which is impeded by a catastrophic and chaotic nature, is dominant. Chaos theory was developed out of mathematical theories and shows that systems that are seemingly random demonstrate underlying order; catastrophe theory postulates that small changes in some small characteristic can cause large and abrupt changes elsewhere in the system (Thom, 1972). The changing of a system from chaos to complex, or the reverse, is referred to as the edge of chaos and is where much of the research in this area is focused (Stacy, 2002).

Figure 1

Complex Adaptive Systems and General Systems Comparison

Complex Adaptive Systems (CAS) | General Systems Theory (GST)

Complex
Unknown unknowns
Cause and effect with retrospective coherence but unpredictable in the moment.

Complicated
Known Unknowns
Repeatable, linearly analyzable with a reductionist underpinning, even if that is time consuming.

UNORDERED — DISORDER — ORDERED

Complexity Theory | System Theoretical Approaches

Chaotic
Unknowables
No cause and effect with no predictability

Simple
Known knowns
Cause and effect relationships are repeatable and predictable and obvious.

(Rumsfeld 2002; Snowden, 2010; Turner & Baker, 2019)

Complex Adaptive Systems (CAS) In Scientific Theory

He et al. (2011) propose that complex systems cannot be reduced to their component parts as their total sum properties depend on the interdependency and interactions of the components (as cited in Turner & Baker, 2019). The systems are always heterogeneous in nature and theoretically are unlimited in their ability to adapt and change (Chiva, 2014. as cited in Turner & Baker, 2019). The resulting outcome is incipient from an undetectable origin and is referred to as emergent. There can be no direct extrapolation to the beginnings of the event as the traveled path is unclear and cannot be duplicated; the precise circumstances can never be exactly

repeated, and all the variables never be replicated. A miniscule change in the environment can infinitely change the results in a way that could not have been predicted because the interactions are situationally unique and construct idiosyncratic results.

Complexity science branches across many areas of traditional science, with many different applications; there is no unified theory or definition. Manson (2001) reduces complexity to three main areas: algorithmic complexity, deterministic complexity, and aggregate complexity. Algorithmic complexity refers to mathematical complexity and information theory. Deterministic complexity describes the seemingly unpredictable, self-organization of systems. It draws on chaos and catastrophe theory, where small changes in a seemingly irrelevant element can create huge and unpredictable changes throughout the whole system. An example of this is the famous anecdote of the flap of a butterfly's wings in Japan causing unpredicted tornadoes in the Midwest of the United States. Finally, aggregate complexity concerns itself with how individual components within the system interact to create non-linear, unpredictable behavior (Manson, 2001).

A complex adaptive system (CAS) is the primary unit of a complex system. A CAS, for example, an individual organism, adapts to a changing external environment by making small internal changes. The processes that cause and promote these changes are self-organization and auto-catalysis which are prerequisites for a CAS definition (Morrison, 2006). The adaptation of the individual CAS causes changes in the environment which creates a dynamic and continuous change recursively (Stewart, 1991). The CAS and the external environment change each other, and one cannot be considered without the other. Systems that do not continuously dynamically transform according to their environment die or move towards entropy; they need adaptation and growth to survive (Stacey,1996). This adaption also produces autopoiesis, both for the CAS and

the environment. The individual nature which has been self-created by adjustment contributes to survival over systems that simply replicate.

Complexity, then, is an interpretation of perspective or framing of a system, using CAS as a base unit, in retrospect. Described within the broad label of complexity are various levels of detail and the post-event patterns that are observed, that seemingly appear from random and unrelated interactions. The conclusions drawn by a researcher can only ever be a perception or an interpretation of what the observer retrospectively witnessed. (Stewart, 2001).

Complex Leadership Theory (CLT) borrows concepts from both aggregate theory and chaos theory and frames the system as both complex and adaptive. This amalgamation offers a radical challenge to the traditional preconceived notions of prediction and control of a system (Tosey, 2002) and challenges the idea that the only alternative to "being in charge" is anarchy (Stacey et al., 2000, p. 124).

Complex Leadership Theory (CLT): An Overview

Complexity leadership theory (CLT) is derived from complexity science (Lichtenstein et al., 2006; Simon, 1962; Uhl-Bien & Marion 2008) and provides a theoretical framework for explaining the social interaction of individuals within a system that many other leadership theories have acknowledged but not fully developed (Lichtenstein et al., 2006). Complexity leadership requires a holistic approach considering the entirety of the organization, not just the traditional decision makers (Lichtenstein & Plowman, 2009; Plowman & Duchon, 2008; Uhl-Bien et al., 2008).

A diagrammatic representation of the conceptual framework described in the following overview is shown in Figure 2. In CLT, leadership is no longer a person or group of people, but instead is an event which can be identified after it occurs. The theory expands the central point of

leadership away from the isolated, role-based actions of individuals and instead expands the focus to contextual interactions which continuously occur across the whole system influencing the decision-making process (Lichtenstein et al., 2006).

In CLT, individual components of the system, or individuals in the community form groups called aggregates (Uhl-Bien et al., 2006), use complex natural teleology, or the deliberate pursuit of a desired end (Marion & Uhl-Bien, 2001), to create leadership events (Marion & Uhl-Bien, 2001). Unlike models that use long established leadership theories, these events can emerge from anywhere in the system, especially at what would conventionally be called the follower levels. Through the mechanisms of correlation, aggregation, and autocatalysis, a resonance is created between aggregates where shared history and experiences produce informal social bonds that build larger social groups called meta-aggregates. Leaders purposely employing CLT disrupt the existing traditional patterns by creating limited conflict, acknowledging uncertainty, and enabling communication between aggregates. Ultimately, traditional leaders provide the structures to facilitate the events and give meaning to what is happening (Plowman et al, 2007b).

The traditional leader has new functions which enable the complexity and fulfill their traditional roles and facilitate the leadership event through coarse-grained processes (Uhl-Bien & Marion, 2008). In the long term, the leadership permanently changes the coarse-grained processes, and the process of aggregate interaction begins again, providing a feedback loop within the system. This view of leadership embraces enabling and learning rather than chasing desired outcomes and controlling the behaviors of followers (Jenning & Dooley, 2007; Marion & Uhl-Bien, 2001).

Figure 2

Diagrammatic Representation of the Conceptual Framework of Complexity Leadership Theory
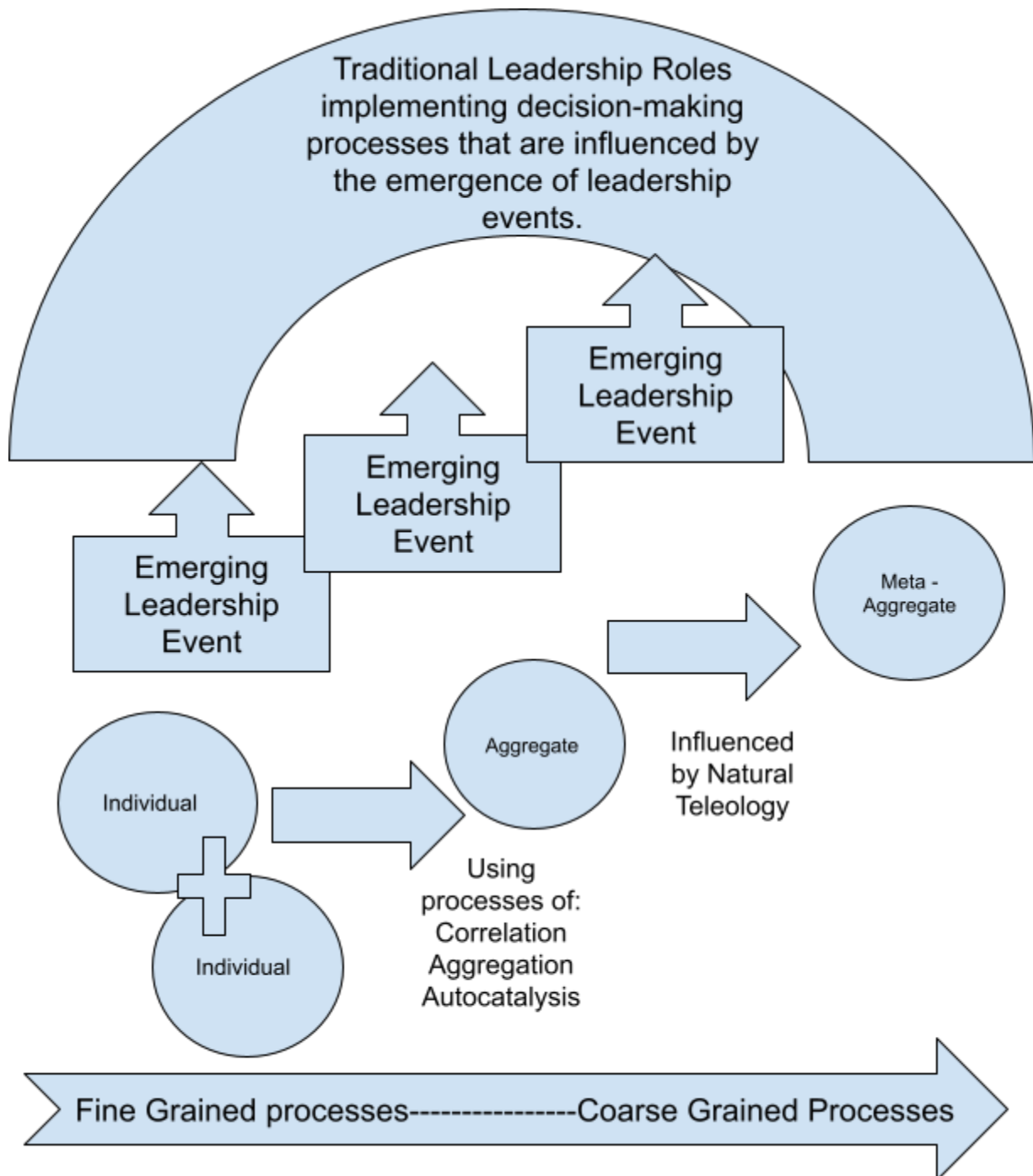
The Edge of Chaos

Complexity leadership events take place on the edge of the transitional state between chaos and complexity, dramatically referred to as the edge of chaos, (Kauffman, 1995; Mitchell et al., 1993, Stacey, 2002), "far-from equilibrium" (Meyer et al., 2005; Prigogine, 1995) and "criticality" (Bak & Paczuski, 1995). The climate of the system is described as a binomial construct of certainty and agreement as shown in Appendix A.

In ideal circumstances, systems are both close to agreement and close to certainty, and rational decision-making takes place (blue). When the agreement between aggregates disintegrates, political decisions are made to bring sides to a consensus (orange). When certainty is in doubt, judgmental decisions must be made weighing the positives and negatives of the problem (orange). When both agreement and certainty are questioned, the system becomes complex (red) before it descends into chaos and anarchy. The complex decision-making area is large but has no defined limitations.

At this point, with the whole system at the edge of chaos, leadership takes the role of fitting within the environment and enabling complexity rather than fighting it. The point in the system where linear predictability changes to approach the edge of chaos is completely obscured to the external observer (Morrison, 2006) and cannot be accurately forecast.

Complex Adaptive Systems (CAS) In Leadership Theory

Complexity leadership theory assumes that the system within which the leadership takes place is a closed complex adaptive system (CAS) (Aagaard, 2012; Albert et al., 2015; Chiva, 2014, as cited in Turner & Baker, 2019; Pslek, 1995). Like scientific complexity theory, the components, or members of the organization, interact in a non-simple, non-linear way (Albert et al., 2015). The system is completely heterogenous with each component being an individual who

operates through their own personal needs and requirements (Chiva, 2014, as cited in Turner & Baker, 2019); perhaps they are making decisions through an identifiable path according to Maslow's hierarchy of needs, or perhaps making decisions based upon irreproducible outside influences. These individuals (or aggregates) are all independent but do not operate in isolation. Their interactions are based on an infinite number of possible scenarios which can be influenced by an infinite number of situations. In addition to this personal behavior, complex social influencing takes place at all levels (Pslek, 1995). This system behaves similarly to a biological organism, as from within the complexity emerges an evolution of self-organization (Battram, 1999; Lichtenstein, 2000; Marion, 1999). The system cannot be controlled by individual aggregates, but in working together, they can influence the direction of decision-making (Aagaard, 2012); they may not know their interactions are creating these changes at the time.

Complex adaptive systems are not singularly defined either within the various branches of science or leadership theories. Instead, scholars have tried to attribute characteristics to complex adaptive systems to broadly identify them. Turner's meta-analysis (2019) of terms for CAS taken from leadership theories and the scientific backgrounds reduces CASs to 8 basic tenets (p9). All the definitions include non-linearity and non-reductionist properties that produce irreducible consequences; there is no definable way to reduce a system to a sum of its parts. CASs are almost universally identified as adaptive and self-organizing, and the paths taken during these processes are perverse and convoluted. CASs operate between order and chaos in a complex area called the edge of chaos. CASs have history that influences pathways and actions taken, but it is unrecognizable as relevant until after the event. The event pathway cannot be identified and traced until it is viewed in retrospect.

Aggregates

The CAS is made up of individuals who are totally independent of each other but form social groups and networks called aggregates; these groups can produce emergent leadership events and influence change and movement in the whole system. In leadership theory, these initial aggregates are groups of people who find some connections through social interaction or common interests, and as these groups form, they reinforce ideas and objectives. The aggregates remain small and are self-limiting in size because of naturally occurring conflicts between large groups which tend to lose their common identity (Marion & Uhl-Bien, 2001).

People construct their perception of reality through their interactions and experiences with media, technology, and each other. They then explain their thinking to one another by storytelling, creating and developing their own unique models and theories as they do (Drath, 2001, as cited in Lichtenstein et al., 2006). People naturally have a subjective memory and construct information into understanding through their own experiences, which subsequently influences their responses to all social situations and interactions (Hazy & Uhl-Bien, 2015). Two individuals who experience the same event each will construct the event and consequently react completely differently from another. This resulting diversity and heterogeneity among individuals as they form aggregates is imperative for a complex system to develop.

Individuals are constantly constructing and reconstructing a reality through their interactions and world views without any reproducible pathways. The complexity of the individual groups, and the non-linear processes that constantly occur in them, cause problems for traditional statistical methods of analysis (Hazy & Ashley, 2011). These interactions can happen in many ways, through face-to-face interactions, or through social media influences and messaging, over long periods of time or brief associations.

An attractor is a social magnet or a gravity pit that draws people into a group environment (Uhl-Bien & Marion, 2009) and influences behaviors within these groups. Generally, people are drawn socially to people who have similar interests and experiences. A commonly used attractor is culture, which Kershner and McQuillan (2016) describe as "the framework of values, beliefs and symbols through which individuals interpret and act on the world" (p. 8). Culture underpins a logic for expectations, practices and processes (Goldstein et al., 2010).

A tag, or a specific ideal, in the form of an unspoken label, enables individuals who share the same purpose to identify one another. Tags are not necessarily overt or immediately obvious to outsiders and are not always identified or spoken by the members. Individuals may solidify an idea and by their charisma and actions become the tag that binds the ideas of the group. Several people may group together around an individual with whom they have a connection but not necessarily form friendships and bonds with the rest of the group. Within complex groups, attractor, aggregate tags promote higher levels of quality interaction (Hazy & Uhl-Bien, 2015) because they limit promulgation and concentrate communication within small groups. Leaders can act as tags when influencing aggregate formation.

The primary unit of an aggregate is a bonded pair (Weick, 1995) held together by an attractor which may have a tag. Aggregates will naturally curtail their size to limit internal arguments that can impose conflicting restraints on the members (Marion & Uhl-Bien, 2001). Large aggregates have difficulty maintaining a common identity and can become complex systems, often splintering into new aggregates and sub-aggregates.

Within a CAS, aggregates are linked by vast networks of couplings and relationships which can be described by their level of tightness. A system can be assessed on a spectrum of

31

relatively tight to relatively loose (Kauffman, 1993, as cited in Marion & Uhl-Bien, 2001). Systems that are tight have many strong bonds across many groups and dictate behavioral norms, with a low tolerance of deviation (Gelfand et al., 2011). Relatively tight interactions allow a community to resist small changes and disruptions, however, when change does come, it spreads rapidly throughout the system.

Relatively loose interactions have unenforced social standards and a high tolerance of idiosyncratic behavior (Gelfand et al., 2011). Within an adaptive system, localized adjustments are made, and subsystems absorb the change without spreading it system-wide (Weick, 1976; Weick, 1979). Moderate coupling is a signature definition of complexity theory (Marion & Uhl-Bien, 2001).

Resonance of Aggregates. Through shared history and experiences, individuals will form aggregates based around attractors and tags; conversations lead ideas to then begin to "appear, incorporate, diverge, corrupt, (and) conflict" (Baltaci & Balci 2017, p. 46). When opinions align, the interactions become stronger, rather like a harmonic sound wave breaking a glass; ideas gain credibility and strength; agreement between aggregates is called resonance.

Weick (1979) describes the basic unit of any organization as being the "double interact" of interdependent behaviors between individuals; that the influencing is a two-way process, a persuasion of both parties. Brown (2011) identifies the three mechanisms of resonance as correlation, aggregation, and autocatalysis. The aggregates align (correlation), informally form themselves into a more cohesive structure (aggregation), and then reinforce themselves in an echo chamber environment (autocatalysis).

Resonance tends to occur when uncertainty and change threaten the equilibrium of a system and tensions arise; aggregates join together to find stability and reassurance and

32

leadership events emerge. Despite the complexity of a system, and the apparent lack of traditional leadership, aggregates function together as an entity, and there is an emergence of order without centralized control. Often new sublevels of the organization are formed organically (Manson, 2001). Both trivial and great ideas appear from these resonant groups which develop from convergence of thought on controversial ideas, internal feedback, organizational rules and social protocols (Baltaci & Balci, 2017).

The resonant interactions between the aggregates are enabled and encouraged by the individuals' deliberate pursuits of a desired end or complex natural teleology (Marion & Uhl-Bien, 2001). Building on Maslow's hierarchy of needs, complex natural teleology assumes the requirements for physiological requirements have been met, and instead concentrates on the requirements from the system. The aggregates fulfill their individual and group requirements via their interactions with each other, through categories labeled as physics, autocatalysis, selection and need (Marion & Uhl-Bien, 2001).

These may take the form of informal conversations in coffee shops, passing chats in the grocery store, or facilitated and structured meetings with the sole purpose of coming together to solve a problem. The result may be that someone is inspired to write an email because they have discovered they are not alone in their concern; or a group may formally present an idea to management in a prearranged environment.

These presentations of ideas, in many different formats, from many different sources, are leadership events which need to be recognized by formal management structures. In the right situations they may ultimately result in wide ranging coarse-grain changes to the system. Separately from this process traditional leaders may enable the interactions and give meaning to what is happening, but they must also understand that they do not specifically direct or control

the interactions; they simply shepherd them into meaning (Plowman et al, 2007b). These interactions can also become beyond individual control and can continue to produce more than a single aggregate would ever be capable of individually (Marion & Uhl-Bien, 2001).

The "physics" of natural teleology between aggregates refers to the physical restrictions and limitations to the groups. If aggregates are geographically separated and require technology to communicate, the limitations of this technology will directly impact their ability to resonate with each other. If there are no opportunities for interaction, then attractors and tags will not be identified, and resonance will not occur. In conjunction with Maslow's pyramid, if the basic infrastructure providing opportunity for communication is not in place, then the higher-level phenomenon cannot even begin.

Autocatalysis between aggregate groups occurs as the resonance becomes stronger, producing groups that reinforce each other. In chemistry, autocatalysis occurs when one of the products of the reaction becomes the catalyst. Here, as individuals interrelate, their attractors become reinforced and catalyze or encourage the interaction. Individuals may impart a bit of resonance on each other but maintain their independence and heterogeneity within the system. Similarly, auto-coordination also develops because of the edge of chaos and spontaneous resonance (Baltacı & Balcı, 2017). As aggregates begin to resonate with each other, they begin to build coordination networks and bring order to the environment (Stacey, 1996).

In the complex interactions of aggregates, there are many competing attractors and influences. Not all interactions have equal weight socially, and the leadership events that emerge from the aggregates depend on a complex selection process. In complex biological processes, this is referred to as natural selection. In leadership and social environments, the ideas with the loudest voice, the first to dominate the conversation, or the idea most repeated and therefore the

34

one with the most resonance is likely to succeed in influencing the decision-making process. Not all members play equal roles, but all the roles are interrelated (Lichtenstein et al., 2006), and, until the event is complete or past, the importance of each contribution cannot be fully evaluated. What seems meaningless and trivial at the time may be the proverbial butterfly's wings that cause the organizational storm. As the environment changes, different aggregates will leverage their skills and experiences (Lichtenstein et al., 2006) and take on the roles of traditional leaders or followers as appropriate. This environment, of many aggregates and individuals espousing different and multiple solutions and futures, adds to the edge of chaos conditions and creates what Lichtenstein & Plowman (2009) describe as disequilibrium.

In accordance with Maslow's hierarchy of needs, the physical needs of an aggregate will play an important part in their interactions. Deliberate need for satisfaction is a function of the individual, not the group, and usually promotes prestige, power and legitimacy (Marion & Uhl-Bien, 2001)**.** This only happens once the physiological and safety needs have been achieved.

Leadership Events

Complexity leadership theory (CLT) does not look at leadership as any one individual or group of people but, instead, as an event. Leadership events emerge through interactions between aggregates and then meta-aggregates over time (Cilliers & Spurrett, 1999). Marion and Uhl-Bien (2001) describe the process as being like the straw that breaks the camel's back: an idea or an innovation appears to have come out of nowhere. These events, however unpredictable, are the result of nonlinear interactions that are constantly happening within the organization.

Each leadership event is an action segment (Lichtenstein et al., 2006) whose meaning cannot be fully dissected until after the event has appeared and passed. Its origins, the dynamic interactions of aggregates, will not be clear until they are seen through a retrospective lens. Not

all the interactions have equal influence on the event, but they all have an interrelated part to play. At the time of occurrence, there cannot be full appreciation for every contributing factor; some occurrences will seem meaningless within localized context when, in fact, they are the lynchpin to the event formation. Lichtenstein et al. (2006) refer to this as the "space between."

Leadership events provide a different conceptualization of leadership within the framework of subjectivist ontology and interpretivist epistemology (Houglum, 2012). Subjectivist ontology examines the concept that reality exists when a phenomenon is experienced and given meaning, for example, when an individual's experiences affect the way they view information from within an aggregate group.

Interpretivist epistemology assumes that "knowledge can only be created and understood from the point of view of the individuals who live and work in a particular culture or organization" (Hatch & Cunliffe, 2006, p. 13), for example, from within the resonances of the aggregates. Together this paradigmatic commitment goes some way to explaining leadership events.

Emergence

Uhl-Bien and Marion (2008) describe emergence as the sudden and unpredictable change event, but it is not sudden, although it may at first appear like that to the casual observer. The emergence of a leadership event then impacts the decision-making process of the traditional leadership positions. Emergence begins with the small resonant aggregates who find they have a common sense of identity, and then, as ideas and resonances breed and multiply, leadership events emerge from the interactions. The events are not, and cannot be, forced or controlled by traditional leadership. Hazy and Uhl-Bien (2015) argue that emergence cannot occur until disequilibrium is present.

The edge of chaos description promotes this emergence, and bottom-up processes lead to emerging order. The order and organization place a traditional leadership downward pressure on the events, enslaving them to be in phase with conventional organizational constraints. This process is called entrainment (Hazy and Uhl-Bien, 2015). There is a constant dynamic relationship between the traditional leadership positions and the informally created and complexly adaptive emergent forces. This chaotic duality of emergence and entrainment is referred to by Hazy and Uhl-Bien (2015) as the spiral of innovation or entanglement (Thomas et al., 2005).

Emergence cannot be seen at the time it is happening; it is only with retrospect that careful observers can piece together the pathway that occurred. Military and political planners Neustadt and May (1986) refer to this in their book of the same name as "thinking in time," here the past, present and future are considered in conjunction with each other. Emergent processes, through which CAS form, are referred to as complexity dynamics, or mechanisms; leaders must develop and foster enabling conditions to create these dynamics without assuming a control position (Uhl-Bien et al., 2007).

Fine and Coarse Grain Properties

Within an organization, there are many interactions continuously happening. There is a distinction between human-to-human, socially based, personal interactions and corporate requirements. Many conversations and interactions that happen during a workday are not causally related to the business of the organization; others have no social aspect at all and are purely professionally oriented. Fine-grained interactions are those that happen to individuals during day-to-day experiences (Hazy & Uhl-Bien, 2015). They are conversations in hallways, or chance meetings at the proverbial water cooler that facilitate organizing.

Conversely, coarse-grain properties can be observed at many levels of the organization and can be both "formal and informal" ((Hazy & Uhl-Bien, 2015). They are the daily routines and the accepted institutional rules which can apply at a local level or corporately across many locations. Coarse-grain properties, or as complexity science refers to them, coarse grain regularities (Gell-Mann, 2002) provide structure, patterns and stability, a standard set of policies and procedures.

Coarse grain properties can develop in many ways including historically and culturally. Fine and coarse-grain properties interact with each other on all of the multiple levels of the organization. Traditionally defined change in an organization happens at a coarse-grain level but is the result of interactions at the fine-grain level (Hazy & Uhl-Bien, 2015).

Using fine and coarse-grain descriptions, Plowman et al. (2007a, 2007b) and Lichtenstein & Plowman (2009) describe the emergent process as unfolding in phases. At first, the potential for emergence is shown by coarse-grain disequilibrium; the system begins to operate at the edge of chaos. Individuals lose their sense of stability, and rules that provide an innate sense of dependability and constancy are questioned. Fine-grain expectations are questioned. In the second phase, some of the successful proposals become adopted and are recombined with historic instruments to create new or modified coarse-grain practices.

When all the changes to the everyday fine-grain interactions combine, they produce significantly reorganized coarse-grain processes. Finally, individuals work to provide stabilizing feedback and bring the system back to dependability in the coarse-grain environments. The traditional leadership roles do not provide stability, and they do not give significance to events; the individuals and aggregates do this through their fine-grain interactions.

Fine-grain interactions influence coarse-grain processes through the mechanism of emergence, and coarse-grain processes in turn influence fine-grain interactions through entrainment, reinforcing Hazy's and Uhl-Bien's (2015) description of the spiral of innovation or entanglement (Thomas et al., 2005).

Creating the Conditions for Complexity Leadership

Complex Adaptive Systems (CASs) may form naturally in scientific theory, but leadership theory identifies conditions that can be manipulated by traditional leadership positions to promote their development. A complex emergent system requires a disequilibrium state or a system operating on the edge of chaos. Lichtenstein and Plowman (2009) suggest that leaders can do this by purposely disrupting the existing patterns and even creating controversy that will provide these conditions, suggesting leaders "embrace the uncertainty" and "surface controversy" (p. 621). This is simultaneously counteracted by traditional leadership positions also fulfilling a sense-making and sense-giving role to avoid the system slipping from the edge of chaos into unmanageable pandemonium.

The functions of complexity leadership can then be developed and applied. The uncertainty of change is continuous with many institutions, especially schools and school districts (Kershner & McQuillan, 2016), and Lichtenstein and Plowman's (2009) suggestion of purposely creating these conditions of uncertainty may almost seem ironically humorous to these organizations.

Stacey describes the parameters by which a CAS can be assessed as: "The rate of information flow through the system; the richness of the connectivity between agents in the system; and the level of diversity within and between the schemas of the agents" (Stacey, 1996, p. 99). These parameters are addressed in the following leadership functions.

Leadership Functions Within the CAS

Despite reading and studying complexity leadership theory, many organizations have traditional leadership roles and hierarchies ensconced within their fabric. For bureaucratic organizations to benefit from emergent leadership events, leaders must foster the conditions which develop a capacity through self-organized networks (Morrison, 2006). Leaders need to balance creating the conditions for bottom-up dynamics to occur naturally and then essentially leave the system alone so that aggregates can form and emerge (Brown, 2011). This self-organization then provides an order without control (Morrison, 2006).

Uhl-Bien et al. (2007) establish three elements of complex leadership that need to be fulfilled to take full advantage of an emergent complex adaptive system within an organization; these are Adaptive, Enabling and Administrative. Building on these concepts, Hazy (2011) created three functions of leadership: Generative (Surie & Hazy, 2006), Convergent and Community Building. Hazy & Uhl-Bien (2015) then formally collaborated and combined the elements into the functions detailing three leadership functions of Generative, Administrative and Community Building with associated complexity mechanisms.

Continuing their work, Hazy & Uhl-Bien (2015) added to this model by adding two further functions of Information Gathering and Information Using. While the first three describe how individuals interact, the last two relate to what the interactions are about (Hazy & Uhl-Bien, 2015). The final five leadership functions are described below with the original leadership elements italicized within the description. A diagrammatic summary of the leadership functions and the details of the mechanisms discussed are shown in Appendix B.

Generative Leadership Function

The generative leadership function (Surie & Hazy, 2006) promotes *adaption* (Uhl-Bien et al., 2007). Generative leaders interact with, and actively engage with, the possibility of emergent dynamics. This is done on the fine grain level where conditions for the edge of chaos are created and aggregates are encouraged to form and resonate by encouraging or stifling entrepreneurial activities in local problem-solving and favoring some solutions over others.

As these groups form and begin to experiment, they are non-linear and have attractors and tags which can be obscure to the outside observer. There are also instances where generational leaders can artificially form groups for a purpose of solving a problem. This generation of conditions for fine-grain interaction, leading to emergence, is called "the paradox of control" as it gives controlling features to something that cannot be intricately managed (Uhl-Bien & Marion, 2009, p. 636).

These fine-grain interactions may produce locally useful coarse grain properties which could lead to larger coarse-grain developments. Hazy and Uhl-Bien (2015) compiled a list of illustrative practices for generative leaders, which include encouraging the broad adoption of innovations that have been vetted (Garud et al., 2006, 2011, as cited in Hazy & Uhl-Bien, 2015) and not punishing failure (Backstöm et al., 2011, as cited in Hazy & Uhl-Bien, 2015).

In the first phase of emergence signaled by coarse-grain disequilibrium (Lichtenstein & Plowman, 2009; Plowman et al., 2007a, 2007b), generative leadership supports innovation and new thinking. In the second phase, generative leadership encourages the implementation of the new ideas. Finally, the feedback from fine-grain interactions is encouraged by generative leadership practices. In conclusion, generative leadership functions are positively correlated to the success of the emergence mechanism to produce new coarse-grain properties (Hazy &

Uhl-Bien, 2015). Using this function traditional leadership positions create an environment that encourages the emergent and unpredictable nature of complex systems. They then create procedures that aim to increase the flow of feedback between and across aggregates to produce fine grain adjustments (Snyder, 2013)

Administrative Leadership Function

The administrative leadership function produces a *convergent* function that ultimately produces stability (Hazy, 2011). Complexity leadership theory aims to integrate the conditions of a system at the edge of chaos with the bureaucratic organizational structure already in place (Uhl-Bien & Marion, 2009); there is still a need for an organizational superstructure that defines procedures, goals, missions and structural organization (Baltacı & Balcı, 2017).

Administrative leaders clarify individual responsibilities within the organization and produce entrainment of fine-grain interactions through coarse-grain procedures. There is highly defined role clarity, with a clear chain of organizational responsibility. Hazy and Uhl-Bien (2015) cite using resources, such as financial incentives, as structured attractors as an illustration of an administrative leadership function producing efficiency and high performance.

The administrative leadership function is positively correlated to the entrainment mechanism (Hazy & Uhl-Bien, 2015). As leaders relax and then tighten the administrative rules and regulations, and promote and then restrict the generative leadership mechanisms, they can enable the process of emergence (Uhl-Bien et al., 2007). Emergence produces self-organization and order among the aggregates leading to entrainment. This function takes place at both the macro and the micro levels of the organization and influences fine-grain interactions and related coarse-grain patterns.

The administrative leadership function can find itself in conflict with the informal nature of the CAS, and so there becomes a dynamic interwoven process within a system on the edge of chaos; under bureaucratic control, this dichotomy is called entanglement (Schneider & Somers, 2006). Entanglement describes the relationship between the formal top-down structures found in traditional organizations and the resonant aggregates formed through complex social interactions. Consequently, administrative leadership functions must work in coordination with generative functions to prevent over authoritarian control mechanisms destroying the emerging complexity (Baltacı & Balcı, 2017).

Community Building Leadership Function

The fine-grain interactions of a community hold it together, building support for each other. Leaders who leverage this sense of community *enable* people to feel that they belong and share a common identity and catalyze these interactions; there are citizenship behaviors, with intrinsic motivation, and a strong sense of trust (Hazy & Uhl-Bien, 2015). Borrowing from the leader-member exchange theory of leadership, community building can create in-groups and out-groups (Northouse, 2015) to make people feel part of something valued and significant (Molleman et al., 2010, as cited in Hazy & Uhl-Bien, 2015).

Fine-grain activities ultimately legitimize coarse-grain understandings and policies. If the sense of belonging is not present at the fine-grain level, it stands little chance of succeeding at the coarse-grain level. As community building leadership is then applied to the coarse grain processes, individuals operating at a fine-grain level begin to acknowledge membership to the larger community.

Community building reinforces generative functions as aggregates begin to work together for solutions and can assist administrative functions with the reinforcement of recognized

processes and social norms. The interactions of the first three leadership functions and their

mechanisms are shown in Figure 3.

Figure 3

Diagrammatic Summary of the Interactions of the First Three Leadership Functions
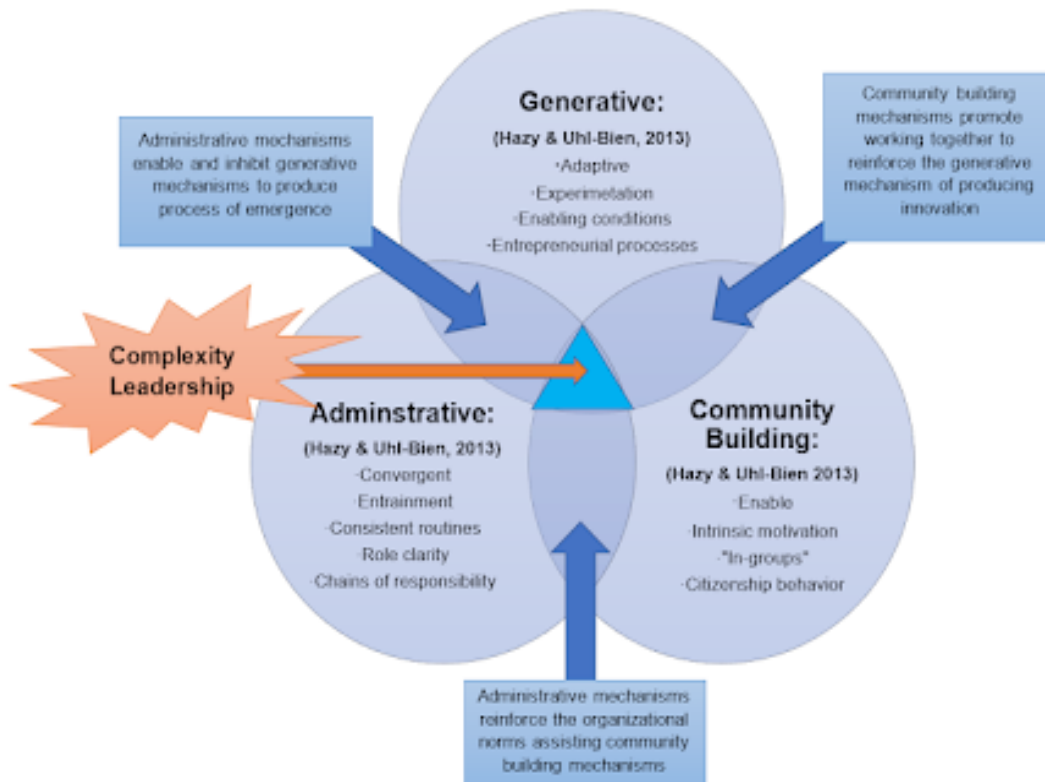
Information-Gathering Leadership Function

Information is not the sole possession of the administrative leadership and is used at all

levels of the system. Fine-grain interactions use information to form aggregates and to inspire

their conversations and ideas. They can then use their interactions and resonance, based on

information shared, to develop a unique perspective of affecting relevant coarse-grain processes.

The information-gathering leadership function must encourage sharing and filtering of the data

that is available and make relevant facts and statistics easily accessible. Distributed data is then

"sensed, decoded, exchanged and interpreted" (Hazy & Uhl-Bien 2015 p85). This function of leadership is especially reliant on diversity of thought and heterogeneity within the system which provide many interpretations of the same data developed by the community building function. Frank exchanges are paramount and the strength of the original attractor within the aggregate may be tested with disagreements over interpretations, but these events may also promote and reinforce relationships in what Backström et al. (2011) call "relatonics."

Information-gathering leaders must use generative functions to make time for and encourage thoughtful consideration of data and actively search for newer, context driven information, from stakeholders. They must also identify the possible new initiatives being proposed from multiple groups, look for the commonalities and use administrative functions to test them (Backström et al., 2011; Surie and Hazy, 2006). Hazy and Uhl-Bien (2015) refer to this process as an integration and synthesis mechanism. Information gathering uses the administrative function to disseminate the data and to collect it in an organized way.

Information-Using Leadership Function

The information-using leadership function uses the fine-grain interactions, seen in the information-gathering function, and makes permanent changes to the coarse-grain processes using the administration function. They redistribute resources as necessary and reallocate responsibilities. This could be a huge organizational shift or a small change to a department; it is facilitated by the administrative function.

The ratchet mechanism prevents the system from returning to the comfort of original coarse grain processes instead of embracing the new and unfamiliar changes (Hazy, 2012). This process is seen in biological complexity science where organisms exhibit enduring coarse-grain processes, even as transient interactions at the fine-grain level emerge, recede, and disappear. It

is not until a new coarse-grain property emerges from these fine-grain interactions that the system re-codes itself, removing the capacity to return to the old mechanism (Hoffmann, 2012, cited in Hazy and Uhl-Bien 2015). Figure 4 summarizes the interaction of the information gathering and using functions with the original three functions.

Figure 4

Summary of the Interactions of the First Three Leadership Functions with Information-Gathering and Information-Using Functions

Administrative mechanisms enable the implementation of the information using function.

Generative mechanisms help organizations implement the new coarse-grain processes.

Community Building maintains the intrinsic motivation to make the information mechanisms work.

Adminstrative, Generative, Community Building
(Hazy & Uhl-Bien 2013).

Administrative mechanisms are used to disseminate data to fine-grain aggregates and then to collect it in an organized way.

Generative mechanism is used to encourage meaningful consideration of data during information gathering mechanisms.

Community Building promotes the interactions and tolerance of diversity of thought and heterogeneity promoting better use of the information.

Information Using:
(Hazy & Uhl-Bien 2015)
· Ratcheting
·Redirection of Responsibilites
·Redistribution of assets

Information Gathering:
(Hazy & Uhl-Bien 2015)
·Intergration and synthesis
·High levels of Discourse
·Data distribution
·Relatonics

Information gathering mechanisms inform the information using function.

Summary of Complexity Leadership Theory

Within Complex Leadership Theory the decision-making process of the traditional leadership positions is profoundly influenced by the emergent leadership events that are a direct result of the interactions of resonant aggregates. The environment is one where outcomes and influences cannot be linearly predicted through cause and effect and instead can be described as a

46

non-reductionist complex system. The resonances between aggregates could be self-organized conversations, in person or through social media, or social groupings based on common interests or may be intentionally supported and encouraged by the generative and community building leadership functions. In an unpredictable environment that can be described as on the edge of chaos, individuals feel the disequilibrium as coarse grain processes are disrupted (Plowman et al., 2007a, 2007b; Lichtenstein & Plowman, 2009) and the fine grain interactions) of everyday conversations and interactions also begin to reflect this turmoil (Hazy & Uhl-Bien, 2015).

As these processes develop and the community becomes a CAS the administrative function of complexity leadership provides sense giving by providing role clarity and consistent routines. By defining the chains of responsibility and providing a sense of consistency, entrainment provides order without control (Morrison, 2006). Distributed knowledge and deliberately facilitated discourse, through the information-gathering function, produces feedback and the emergent leadership events ultimately change the coarse grain procedures of the system by influencing the decision- making process.

Complexity Theory in Education

Research of complexity theory in education falls into two main areas: research concerning complexity within the classroom, influencing pedagogy and the way students and teachers interact; and as a leadership theory viewing schools as complex organizations that are subject to constant changes in policy, curriculum, and personnel (Kershner & McQuillan, 2016).

Within a pedagogical context, complexity challenges the current classroom environment of heavy prescription and mandated content with interdisciplinary, emergent constructivist curriculum (Morrison, 2006). From a leadership perspective (the prime concern of this research) educational systems operate under unique political, cultural, and (hopefully) academic

47

dimensions (Kershner & McQuillan, 2016) producing perpetual redevelopment and re-organization. Schools are, ontologically, systems of relationships (Kershner & McQuillan, 2016). Without consideration of (huge) outside influences, the building is fundamentally built around both the intra- and inter- relationships of students, parents, teachers, and administration. Fink, (2000, quoted in Kershner & McQuillan, 2016) sums up the advantages and possible limitations of using a CLT model in an educational environment:

> [P]reventing, or at least minimizing, the attrition of change requires attention to a complex interrelationship of many factors that influence purposes, structures, and cultures in schools. . .. The complexity of . . . their connections and relationships, make it virtually impossible to determine exact pathways of causation, and therefore impossible to predict with certainty that attending to this factor or that will ensure a school's continuing growth and development. (p. 38; emphasis in original)

In sum, schools naturally exhibit many of the defining features of a CAS. There are huge numbers of factors that influence every facet of school life. The relationships and resulting influences of parents, and faculty on the decision-making processes of traditional leadership positions are both nonlinear and non-reductionist. Schools are constantly operating in environments of change and within these unpredictable and changing environments, where nothing stands alone and everything is ultimately interconnected, (Kershner & McQuillan, 2016) there is significant applicability for CLT (Morrison, 2010).

GMS as a CAS

Schools and school systems are dynamic and unpredictable organizations where small changes to seemingly insignificant details have huge effects on events that were previously

assumed to be unconnected (Morrison, 2002). They are "complex, complicated and constantly changing" (Morrison, 2002, p. 26) and are not just organizations that develop the learning potential of the students but fundamentally they must be learning organizations in the evolutionary sense. Schools experience ongoing change and disruption through adjustments in policy at all levels of the system, minor and major curriculum rewrites, and leadership and personnel changes, which are especially prevalent in inner city and Title I schools (Kershner, 2016). The agents involved in any education environment are beyond numerous.

GMS has three grade levels, with an average of eleven hundred students total. Each year group has eight core subject teachers (math, English, science and humanities) and two or three elective teachers including Spanish, band and computer technology. Most students do not take electives but instead have math enrichment and English enrichment added to their schedule to help increase their basic skill levels in these areas. There is a PE department of six teachers and a special education support department of eight teachers. Additionally, there are two deans per grade level, numerous administration staff, four custodians, three resource offices on shift at any time, a librarian, a nurse, and a special education services department with six specialized teachers.

There are over one hundred members of faculty and staff at GMS. Each subject and functional area has a supervisor at district level who works directly for the district superintendent who is board appointed. Structurally education reaches further to economic and social factors than any other organization spreading influence and being influenced by such seemingly diverse and unrelated issues as employment and housing situations. A school which does not meet local demands, whichever sector of the community those demands comes from, and appears as an isolated entity, will proverbially die (Morrison 2002).

Old fashioned models of simple linear causality cannot work in these environments, as many aggregates and groups compete for resources and influence. CLT, then, suggests a move from traditional school management structures towards locally based solutions that come from diverse networks of autocatalyzed aggregates, with a teleologically based emphasis of child-centered decision-making (Morrison, 2006). The aggregates naturally want the best for their students that will create emergent leadership events based around this need if it is not being met with current coarse grain structures. Acknowledging the school community as a CAS means that school leaders become responsible for creating a culture that "requires school communities to collectively and consistently evaluate taken-for-granted assumptions about effective teaching, student achievement, and parent involvement" (Elmore, 2000; Fullan, 2005; Gilstrap, 2005; cited in Kershner & McQuillan, 2016, p. 8). This also implies the intentional use of the heterogeneity of the community within the generative and community building functions to promote enabling conditions for the required emergence of leadership events.

Criticisms of Complexity Leadership Theory

Morrison (2006, 2010, 2012) describes Complexity Leadership Theory as non-optimal, non-controllable, non-understandable, and non-immediate, and he is a proponent. It is non-optimal as there is deliberate redundancy in the system which is described by commercial critics as inefficiencies; it is non-controllable as then the system must be left to self-organize and emerge; it is non-understandable as the processes can only be seen in retrospect; and it is non-immediate as CASs take time to form aggregates around previously hidden tags and attractors.

Complexity Leadership Theory (CLT) although derived from relatively new understandings in the scientific field can be misinterpreted as a reinterpretation of several older

leadership theories. Morrison (2005) cites Giddens's (1976,1984) theory of structuration as an example of an older theory that has many similarities to the new theory. CLT has limited prospective or predictive utility (Morrison, 2005); it can only be used in retrospect to analyze that which has already happened. This limits the ability of leaders to forecast and influence outcomes, removing their control which is the irony of adaptive and emergent systems in a leadership theory.

There is a risk for leaders in allowing a CAS to emerge and adapt, particularly in high stakes educational environments where student and school failure are so catastrophic (Morrison, 2010)). If, however, a principal or school leader cannot predict the future outcomes using CLT, how much responsibility do they morally have for the outcomes? Conversely, the same course of action will never produce the same results within a system twice. What are the moral implications for a completely different outcome to the one expected? Despite there being no prediction of causal relationships, the previous body of education research does not become null and void. Good leadership practices, for example providing students with timely and appropriate feedback about their progress, will still yield positive results. Parental involvement in student learning, positive classroom environments, effective building leadership, lunches and breakfasts for students experiencing food poverty, increased chances of employment after school graduation, have all been shown to yield positive educational outcomes; complexity does not undermine these predictions (Manson, 2008).

A common definition (Wang, 2016) of complex leadership theory (CLT) highlights one of the main criticisms of the proposal. While fostering complex adaptive system (CAS) dynamics, CLT constructs control structures that are like formal bureaucratic organizations, effectively integrating edge of chaos uncertainty with structured administrative roles. The two

51

environments appear to conflict with each other. Ortegon-Monroy (2003) compares the liberating constructivist approach of leadership events emerging from aggregates to the structuralist approach of artificially creating the aggregates, ironically mandating self-organization. She argues that entanglement is not just present (Marion & Uhl-Bien, 2015) but is detrimental in that there is no solution for how to replace traditional administrative command and control without using traditional administrative command and control methods. Brown (2011) counters this with the argument that leaders should temper their attempts to control fine-grain interactions in the traditional sense and should instead focus on developing their ability to influence organizational behavior in coarse grain procedures. Marion & Uhl-Bien (2015) also dispute this by showing that the mechanism of entrainment within the administrative function is vital to the successful implementation of the generative function.

With Hindsight: Education Before COVID-19

In the wake of the largest world-wide school shut down since World War II (d'Orville, 2020) with over 1.5 billion learners in 165 countries (UNESCO, 2023), it is difficult to remember what was happening in education before the COVID-19 pandemic. Prior to the March 2020 lockdown the vast majority of schooling occurred in person in brick-and-mortar establishments with lessons and learning mainly done with paper-based products (Marshall et al., 2022). There were massive shortages of professionally trained teachers, The Learning Policy Institute published a paper warning of a coming crisis with "an estimated 300,000 new teachers [being] needed per year" by 2020, and "by 2025, that number will increase to 316,000 annually" (Sutcher, Darling-Hammond & Carver-Thomas, 2016, p. 1). They cited that "A number of states greatly expanded emergency permits to allow hiring of untrained teachers to meet these demands" (Sutcher, Darling-Hammond & Carver-Thomas, 2016, p. 1). The pressures on these

teachers was rising as the No Child Left Behind (2001) legislation and its required high stakes testing and the unintended consequences of a narrowed curriculum, focusing on a low-level skills (Darling‑Hammond, 2007), was replaced with the Every Student Succeeds Act (ESSA) which was signed by President Obama on December 10, 2015. Critics of the new laws argued that "The federal and state policies of the recent past have aimed to turn education into a competition for higher test scores, despite the fact that testing always favors the advantaged over the disadvantaged" (Ravitch, 2016). Proof of learning by way of standardized testing seemed to be the central tenet of all government legislation that ultimately dictated funding.

Criticism of schooling is certainty not new but before the pandemic the calls for reform were mounting, as it became apparent that schools were not able to deliver in the present let alone prepare students for the future. None of the reforms being enacted seemed to change the actual "grammar of schooling" which Tyack & Tobin (1994) had condemned over twenty years earlier and bring about the much called for change. The edict of the much quoted Richard Riley, former Secretary of Education, that "We are currently preparing students for jobs that don't yet exist … using technologies that haven't been invented … in order to solve problems we don't even know are problems yet" was not being achieved.

What Did the COVID Pandemic Do to Education?

Michigan was the first state to close its public schools on March 12, 2020, with all but two states (Nebraska and Maine) closing all their public school buildings within eleven days (Marshall et al., 2020). Without question the COVID-19 pandemic shook the modern world. With the closure of schools, teaching and learning were also paused and had to be reorganized (Zhao, 2020, p1). Quick responses were required with the priority of teachers being the well-being and safety of their students during immense uncertainty. With formal testing and

evaluation adjourned, Netolicky (2020) eloquently frames this period as being a tension between the educationally immortal works of Maslow and Bloom, balancing the importance of Maslow's physical and psychological safety with Bloom's learning and academic rigor (2020). Most school districts offered online instruction, but it became clear that COVID-19 "exacerbated well-being issues and highlighted how education inequity profoundly affects those in society who have the least" (Harris & Jones, 2020). In a blog by the president and CEO of the Learning Policy Institute, Darling-Hammond, shows that the pandemic began to shine a light on problems that educators had known about for years, but that policy makers had ignored.

> The pandemic has highlighted disparities in access to digital devices and the internet. When schools were closed, 15 percent of U.S. households and 35 percent of low-income households with school-age children did not have a high-speed internet connection at home. In early April, nearly 2/3 of leaders in high-poverty districts reported that a lack of basic technology was a 'major' problem. (Darling-Hammond & Kini, 2020)

To negate some of the technological problems, some schools opted for a hybrid model, supplementing online instruction by home sending packets of worksheets to students who lacked internet access. This was logistically tricky as it involved some kind of contact between the school and the students to physically hand over the packets. In the beginning of the pandemic there were protocols for leaving papers untouched for a week to kill any transported virus adding to the logistical nightmare and the insecurity of teachers who asked questions like – can the virus be transmitted by worksheets, and how do we know a week is long enough? But whatever the local approach to remote teaching and learning, the nature of teachers' work shifted radically, and practically overnight (Marshall et al., 2020). Harris sums up the disruption by saying

"Teaching and learning practices have dramatically altered, the core functions of schools have shifted and education leaders have been pushed to the very limit" (Harris, 2020, p. 321). With constantly evolving mandates at federal and state levels schools spent considerable time pivoting to accommodate new rules and restrictions while still delivering learning.

How COVID Affected Teachers

As the regular learning approaches of handing out worksheets in a brick-and-mortar classroom with rows of neatly but closely spaced desks became obsolete, online learning became a salvation for learning (Sharma, 2021). However, Marshall et al. are at pains to point out that the online education that happened during COVID is not comparable to "regular planned practice of online instruction" (2020). They describe what happened when the pandemic was declared and school buildings suddenly closed as Emergency Remote Teaching or (ERT) (Marshall et al., 2020). There was no normally required transition that should have included some kind of onboarding procedures to familiarize the students and teachers with the procedures and the software. There was simply school in a classroom one day and school at home the next. It is in acknowledgement of these extraordinary circumstances, and not the use of remote learning per se, that guided teachers and district leadership to reduce their normal curriculum to core standards. Online teaching has been used effectively and rigorously for significant time in schools across the country with outstanding results - COVID-19 ERT was not an example of this teaching method (Marshal et al., 2020)

During the pandemic many academics began writing articles to sooth teachers and help them cope with the immense upheaval. Some academic articles began to feel like self-help manuals for example Merrill (2020) titled an blog "Teaching through a pandemic: a mindset for this moment" in which he lays out an approach for the sudden change. Merrill (2020) begins

with the advice to "Start by being reasonable with yourself. It is, in fact, impossible to shift to distance learning overnight without lots of trial and error. Expect it, plan for it, and do your best to make peace with it" (p. 2). Later, under the subheading "acknowledge the extraordinary," he offers more sage advice: "We're all operating in the shadow of a global pandemic, and it is disorienting and limiting …business as usual is unrealistic" (Merrill, 2020, p. 3). Teachers were offering each other these reassurances and support as their world lurched into new territory.

The tenacity and determination of teachers during the pandemic, to intentionally do their absolute best for their students' holistic welfare (Harris, 2020) and not just their academic achievement was in direct contrast to those who had previously said that teachers are extrinsically motivated through government legislative mandates (Francois & Weiner, 2022). With huge amounts of software flooding the market and very little training or direction available teachers had to rapidly learn how to use unfamiliar technologies, experimentally try new instructional strategies, and above all be incredibly flexible when these strategies didn't produce the results they had hoped for (Marshall et al., 2022).

How COVID Affected Students

This school aged generation of students (generation Z) are arguably the most technologically savvy in history who, according to demographic-oriented marketing websites, "got their first smartphone just before their 12th birthday" (insiderintelligence.com, 2022). Despite this familiarity with instant virtual communication the COVID-19 pandemic profoundly affected these students who, by best estimates, on average, experienced sixty-five days without any contact (Levinson & Markovitz, 2022). The long term effects of the lockdown of school are, as yet, unknown but in the short term "students a full year later were about two months behind academically where they would normally have been" (Levinson & Markovitz, 2022, p. 4).

It seems obvious, but it is worth stating that the lockdown did not affect the students in isolation. Federal and state mandates pushed many families into food poverty with a combination of reduced or no working hours and illness from the pandemic. In the absence of external child care, which had all been closed, those families who had work hours relied on family to look after younger siblings - with this often falling to older school aged children. In these circumstances school and education became secondary to family survival. National surveys show that nearly one third of students in schools with high numbers of students in poverty were not logging in or making contact in any other way, almost three times higher than schools with low numbers of students living in poverty (Herold, 2020).

Poor households were disproportionally affected by the pandemic lockdown which affected the health care system, economy and social safety nets of millions of lower income Americans (Herold, 2020) while simultaneously students in those households suffered academically. Virtual schooling relies on a student having both a device to do the work and a high-speed internet connection to receive the instruction. One in five of those students on free school meals had no access to technology at home compared to 97% of private school children (Harris, 2020). With 15% of US households and 35% of low-income households having no access to high-speed internet (Harris, 2020).

How COVID Affected Leadership

Individual school building leadership has traditionally been guided by many and varied external factors beyond any individual control. During COVID however many of those external influences were suspended or scrapped altogether, providing a totally original situation. Several states suspended externally regulated testing - many colleges stopped using standardized tests for admission requirements. District mandated teacher observations were put on hold and summative

and formative assessments in highly regulated grade books were dispensed with as many higher administrations mandated that students should not be allowed to numerically fail. A significant amount of the external factors, that government had for decades, insisted provided extrinsic motivation for teachers to increase student achievement, were removed. This pause provided school leaders with the ability to use alternative "accountability levers" to support teachers and students in new intrinsic ways (Francois & Weiner, 2022). Netolicky (2020) describes the COVID pandemic as forcing building leaders into "considering the humanity of education, rather than its measurable outcomes" (p. 392).

These "new" internal motivations (which are not new at all but now being bought to the forefront) are summarized by Francois and Weiner into three areas: principal expectations for teacher performance, principal collaboration with teachers and teacher collaboration with each other (2022). These three heading provide a blueprint that is principal lead and rooted in intrinsic motivation, based on individual assessments, prioritized by the local environment rather than government dictated catch-alls. What this new approach highlights is that most school leadership training is now out of date and not fit for purpose. The previous period of stability, and continuity (if education can ever be described like this) did not prepare leaders for the disruption and disorganization of COVID (Harris & Jones, 2020).

In this new era of leadership Harris and Jones (2020) have proposed five key areas that leadership training must acknowledge going forward from the pandemic. They emphasize that (1) self-care must be a consideration for leaders who must take time to ensure that they are physically and mentally at their best and ready to lead. (2) A balance must be struck between the effective use of technology and pedagogy which centers student learning. (3) In post pandemic leadership training crisis and care management become critical skills that cannot be overlooked

or underplayed. (4) The communities that surround the students and the school must be used as a key resource. (5) Harris and Jones argue that distributed leadership becomes a default. These pillars are in direct agreement with the structures proposed in complex leadership with generative mechanisms providing what Harris and Jones are calling distributed leadership and the community building mechanisms acknowledging the importance of the holistic environment.

Lessons for Post-COVID Education Using COVID as a Catalyst for Change

The federal and state mandated closure of schools for the COVID pandemic produced extraordinary circumstances which have caused more unintentional disruption than any other intentional education reform. We would be shortsighted if we as a community thought that this was the last time that schools will close for a substantial amount of time for some crisis, nt necessarily health related. In the last two years schools have closed their doors because of "wildfires, floods, violence,... teacher and bus-driver shortages, strikes and budget shortfalls" (Levinson & Markovitz, 2022). Treating COVID-19 as an historic short-term crisis, which has been overcome and dealt with, will inevitably lead to an important missed opportunity to change schools and school systems for the better (Zhao, 2020). To view the emergency leadership practices as some "temporary, quick fix until normal service is resumed" (Harris 2020 p321) misses the point and the immense opportunity that we have to reevaluate and to lead differently and hopefully more effectively. Marshall et al. (2020) do not underestimate the situation when they describe teaching as being at a "critical fork in the road" (p. 553).

Schools should take the parts of educating during COVID that they found to be the most useful and continue these practices, finding benefits from emergency mechanisms they put in place. (Daniel, 2020). The education community must identify the good things that came from COVID pedagogy and make sure these procedures are not lost in a "back to business as usual"

approach. Marshall et al. (2022) suggests three steps: first identifying specifically which students benefited from virtual learning. While there were many students that did not benefit from ERT there were some groups that thrived at home away from the regular classroom, Students, who through illness or disability, including social anxiety, find attending school difficult and students who need to work or care for others during the day especially benefited from virtual, asynchronous lessons (Levinson & Markovitz 2022). Secondly their academic progress needs to be analyzed to identify the details of their improvement and then thirdly the question "how can these students be best served moving forward?" (Marshall et al., 2022) must be answered rigorously.

There are many suggestions for new arrangements for schools. Technology supported learning will inevitably be part of the future of education (Darling-Hammond 2020). Increased use of technology is not a new area of research and its use in the classroom has historically been shown to be beneficial but only when goals are set and students are motivated to learn (Marshall et al., 2022). Its use needs to be continued and encouraged within the researched boundaries that produce positive academic results. This increased use of technology assumes that the digital divide, that was highlighted by the pandemic, is seriously addressed.

Other changes that have been proposed offer students, who thrived outside of the traditional classroom environment, an online option (Marshall et al., 2022). Perhaps all students should have one day a week of asynchronous learning, so that if the worst happens again processes and procedures are in place for a smooth transition.

COVID and Complex Leadership

Structurally education reaches further to economic and social factors than any other organization spreading influence and being influenced by such seemingly diverse and unrelated

issues as employment and housing situations. When the state and federal governments ordered the closure of public-school buildings because of the COVID-19 pandemic the lives of the students were profoundly affected. Formal external motivations were removed from building leadership and in turn from teachers. Complex Leadership Theory suggests a move from traditional school management structures towards locally based solutions that come from diverse networks of autocatalyzed aggregates, with a teleologically based emphasis of child-centered decision-making (Morrison, 2006). The aggregates naturally want the best for their students that will create emergent leadership events based around this need if it is not being met with current coarse grain structures. Acknowledging the school community as a CAS, means school leaders become responsible for creating a culture that "requires school communities to collectively and consistently evaluate taken-for-granted assumptions about effective teaching, student achievement, and parent involvement" (Elmore, 2000; Fullan, 2005; Gilstrap, 2005; cited in Kershner & McQuillan, 2016, p. 8). This also implies the intentional use the heterogeneity of the community within the generative and community building functions to promote enabling conditions for the required emergence of leadership events.

Chapter 3: Methodology

I begin this chapter with an outline as to why this study employs case study methodology and examine case study as a research method. I then consider my role as researcher with a reflexivity statement detailing my place in the community I am studying. I then detail case study research design as it applies to my specific study including how I have implemented the theory to my research. This incorporates the epistemology of case study in line with my objectives and the influences this has placed on my data sources and collection plan. I then describe my post activity data management and my proposed data analysis methods. Finally, I examine how I have ensured verification of the interpretation of my data.

Purpose and Rationale of the Study

Within education communities across the world difficult decisions had to be made which balanced the safety of the faculty and students, and the need to maintain normalcy and continue with the business of educating the next generation during the COVID-19 outbreak. Studying the way these decisions were made provides an understanding of how diverse influences throughout the community can play a significant role in shaping a traditional leader's approach to a new and difficult situation. It shows how the community's ability to adapt and evolve to a situation through emergent processes can be modeled using complexity leadership.

The process of making decisions that will affect large numbers of people is never a simple undertaking; many factors influence decisions to greater or lesser degrees. Can a traditional leadership role within a school community embrace the complexity of a community and integrate it into their decision making? Can stakeholders in the community engage in a role of emergent leaders who influence the policy decisions being made? Do the stakeholders recognize their new role and does leadership encourage it through identifiable mechanisms?

Complexity leadership has been studied in conjunction with school leadership (Morrison 20002) but this case study, of a specific educational community, during a global pandemic, identifies the emergent leadership and the roles behind them.

Complex leadership has been described by several different authors within the literature, but it has remained reasonably theoretical in its research. There have been demonstrations of complex leadership theory within the commercial sector and there are educational leadership researchers who are exploring CLT in school settings, but this dissertation builds an understanding of how the community interacted and then used the theory as a theoretical framework to facilitate discussion.

Several researchers within the field of complexity leadership theory suggest case study as a suitable method for analysis. Brown (2011) suggests a "longitudinal study of an organization, using the lens of CLT to begin to understand behaviors observed" (p6), generating the theory from the case (Rule & John, 2015). Morrison (2006) concurs that "case studies, rather than, for example, randomized control trials, are an appropriate research methodology for complexity theory" (p4). Both suggestions support the rationale for using a case study analysis.

COVID in the South

On March 13, 2020, the state officials confirmed their first case of coronavirus in the southeastern state where MPS is situated, and the governor declared a state of emergency. A state health order on March 19 formally closed all private and public-school buildings, though most were on spring break at that time, making the physical logistics of closing buildings easy but the communication of policy difficult. The announcement originally stated that all schools would be closed for the following three weeks (Fiscus, June 30, 2020), implying students would return to school on April 6th. However, the virus continued to spread and on March 26th the governor

announced that Alabama public schools "should plan to finish their school year at home" (Powell-Crain, June 30, 2022) a decision they said they "had not made lightly." They issued an order that all local school systems should now plan to complete the academic year using "alternative methods of instruction" with this plan beginning on what was to be the original return date of April 6 (Powell-Crain, June 30, 2022). The period between the original shut down and April 6 was officially excused by the state level government stating that, during this period, all learning was optional, and meaning "school officials cannot assign graded work or require work of students." At that time there were four Southern states that decided not to reopen at all during that academic year.

The governor then issued staffing decisions and restrictions to the local school districts' leadership teams, limiting who had access to the buildings; concurrently, they stressed the importance of "remaining in accordance with all applicable public health orders and the recommendations of the Centers for Disease Control and Prevention and the Department of Public Health" (Powell-Crain, March 26, 2020).

The state superintendent met with all the superintendents in the state on March 27 to discuss how they were going to implement the plans for continued learning. He acknowledged that the 139 school districts supporting 380 high schools had very different levels of capacity for the task ahead of them. There were a multitude of difficulties and problems that were going to affect the alternate methods of instruction, and each school district faced a unique combination of challenges. The governor stated "nothing can replace the interaction between the teacher and the students in a classroom setting. However, access to high-quality instruction is crucial for our students to maintain their competitive edge academically" (Powell-Crain, March 26, 2020).

During these successive press conferences and announcements, the governor also specifically mentioned students who had individual learning plans (IEPs), saying it was important to make sure students continue receiving special education services they need "to most closely approximate the therapy and special services they would receive in a normal school day." These oral statements - backed by the required legislative paperwork - provided district superintendents, and subsequently the building principals, with the bare-bones structure for the next year and a half of teaching.

Case Study as a Methodology

Every research situation is distinctive and discrete, but a substantial amount of research aims to eliminate obvious distinctions and purposely draw generalized conclusions that can be applied universally. Within the discipline of quantitative analysis, isolated cases are identified as outliers and mathematically removed; they are considered unhelpful to developing a broad hypothesis that encompasses all cases. The antithesis of this one size fits all approach is case study research. The uniqueness of the situation being studied sits in parallel to the commonality, but, as Stake (1995) says, this is the very thing that provides the interest for the case study researcher. Case studies are not generalizable in the same way as mathematically led quantitative investigations (Kanno & Kangas, 2014). Indeed, some are purposely chosen to be as atypical as possible, showing a separateness that provides insight into a new and distinctive situation. Some have concrete universals (Erickson,1986, as cited in Kanno & Kangas, 2014) that can be broadly applied to other situations, other methodologies embrace the comparison of studies to produce context and depth (Bartlett & Vavrus, 2016), but the peculiar personality of the case is never underestimated. Stake (1995) states that a good case study is not dependent on its typicality.

Case study research relies on an in-depth understanding of the how and why of a situation and its people (Baxter & Jack, 2008). It allows for research that employs more than one epistemological lens to provide a far-reaching comprehension rather than just superficial appreciation and acknowledgement. An identifying feature of case study research is the use of multiple data sources and many different data collection techniques which Baxter and Jack (2008) cite as being the source of data credibility; interviews are analyzed alongside archival records, and observations are compared to physical artifacts to provide a holistic overview of the subject area. This method of research can produce immense amounts of data which require management and analysis to build the necessary interconnected web of information braided together to provide deep level understanding (Baxter & Jack, 2008). To limit what can be an overwhelming amount of information, case studies are given boundaries to focus the research. Bounded systems are usually defined by one or more of three restrictions listed in Baxter and Jack (2008): time and place; time and activity; and definition and context.

This Case Study

This dissertation is an instrumental, single case study design, which is the use of a case study to understand something else (Stake,1995). The *case* is a community who are bonded by their association to a Title I middle school and bounded spatially and temporarily (described in detail below). The *study* seeks to develop an understanding of the complex leadership within this community during the COVID-19 lockdown. This research then describes and analyzes an understanding of how a school community and the administrative leadership handled the decision-making process when the educational environment suddenly changed from traditional classroom-based school to remote learning from home due to a combination of federal, state and local government-imposed movement restrictions. By using semi-structured interviews with

stakeholders, including teachers, and paraprofessionals and personal observations it explores how this radical social and academic adjustment for the community, shaped individual and group interactions both with the school administration and each other during this time. I have also interviewed the administration, and other staff within the school who are not directly employed by the building, providing a holistic approach to the community.

Within the study of complexity leadership, Lichtenstein et al. (2006) is one of the few research groups that have compiled a structured plan for observing and measuring complexity leadership, they suggest the following five steps:

1. Identifying and bracketing the events, episodes, and interactions of interest.

2. Capturing these events or interactions as data in a systematic way.

3. Gathering individual/agent level data that describe interaction clues over time.

4. Modeling these data in ways that highlight their longitudinal and relational qualities.

5. Analyzing these data in terms of their relational qualities and longitudinal dynamics.

This method assumes that the leadership events are seen and then the verification for the events is captured through research. Conversely this study is going to look for the proposal of a leadership event through interview, documentation and artifacts and then identify the event from this evidence. This is the reverse observation from Lichtenstein et al.'s (2006) proposed method but finding evidence for leadership events before identifying the events themselves leads to the understanding of the emergence as a primary objective, the aim of this research.

Reflexivity Statement

I was born in Staffordshire, England and attended British universities before attending the British Military Academy and becoming a British Army Officer. During this time I met and married my American husband and moved to The United States to follow his military career. I

became an American citizen in April 2019 and after several military moves we settled in a medium-sized city in the south of the United States. I have been described as contingently white, seen from a distance it is impossible to know that I am not from the city in which I live. It is not until I begin to speak that my heritage becomes obvious. During one of my classes one of my eighth-grade students asked me if something I had said was sarcastic, I replied that because I was British sometimes some of the things I say can be misinterpreted. One of my students stood up and announced to the class "She's British she ain't even properly white. She can say the "N" word and everything because she ain't even white." This interaction shocked me, but my student had candidly shown that I was perceived as an outsider looking in at the school community. This perception albeit in a more nuanced and mature way, was, I think, shared by the adults at the school so my interview technique, of semi-structured, ethnographic interviews, requires significant reflexivity. A table of reflexive questions for an interview produced by Brown and Danaher (2019) is at Appendix C.

I accepted a job at GMS without ever seeing the building. I was abroad with my husband who was a Government Service worker (GS) for the United States Government, and I interviewed for the teaching position over a zoom conference call. I am not originally from the United States and the exterior of GMS was originally quite a shock to me. Built in 1957, it was originally a segregated school, but there is no mention of its history on any of the web searches I did for this dissertation; the only way to find out the history is to ask local people, because oral history is still very important here. Little has been done to change the physical appearance of the school building in the last sixty-five years. The old photos are easily recognizable as the same building with the only difference being that some individual glass panes in the large front facing windows have been replaced with plexiglass, which has yellowed and misted over in the hot

Southern sun turning them opaque, and there are now window air conditioners sticking out from the front, marking the individual classrooms.

I began teaching at GMS in August 2021, eighteen months after the initial lockdown was announced by the state governor. By that point the students and staff had done an academic semester of completely virtual schooling (March 2020 - May 2020) and an academic year of mixed teaching (August 2020 - May 2021) where students were given the choice as to whether to complete school in person or from home in a virtual environment. This case study will concentrate on the first semester of the pandemic, from spring break 2020 to the summer 2020, finishing the study at the end of the academic year 2020. This period of study is over eighteen months before I started working there which provides me with a certain amount of objectivity despite being a current member of the faculty. In interview teachers have occasionally conflagrated their experiences to include the whole of the eighteen months of pandemic schooling and talked about the beginning of the lockdown, and the subsequent year they had just completed, interchangeably. I have tried to reflect their experiences while maintaining my focus of the time span of interest.

The recent political history of the school district puts the school into context within a difficult situation; in 2018 a controversial sale of another school building in the district, and the subsequent rezoning, increased the student population at GMS by 234 over a single summer, leaving the building straining to house the maximum recommended capacity (90%) (Yawn, 2018). The student population during the 2022 academic year was just under 1000 serving grades 6 through 8, though the building is zoned for 600. GMS's minority population is 94% with 84% of the school population being economically disadvantaged. Eleven percent of the students scored at or above the proficient level for math (compared to a district 32%) and 21% scored at

or above that level for reading (compared to 31% for the district). GMS is ranked 311 out of 415 within the state's middle schools. The principal is quick to emphasize, however, that these numbers do not truly represent the school he leads. Having recently defended his PhD, which studied initiatives related to climate in a high poverty middle school, he is enthusiastic and eternally positive. There are several members of staff who openly say they would not be working in this school if it wasn't for his leadership. The environment of large numbers of high need students in an old building means that classroom management is the number one priority of most of the teachers with academics and learning coming a close, but noticeable, second.

Research Question

This research focuses on the changing decision-making processes of traditional leadership positions and examines the influences and interactions of aggregates on this operation. When the school abruptly transitioned to a new virtual teaching and learning format teachers tried to find ways of delivering new curriculum requirements in effective ways. This involved innovation but also adherence to administrative requirements. Teachers created fine grain adjustments that were subsequently adopted into coarse grain policy or stopped by the administration. I have investigated the changes in policy that were instigated, through non-traditional leadership events, as the lockdown situation progressed, leading to my research question: *How did the decision-making processes of traditional leadership roles change through the interaction of the four functions of complex leadership theory in a Title I middle school, in response to the COVID-19 crisis?*

Case Study Boundaries

This is a bounded system both spatially and temporally. The time limitation of this study is from the lockdown announcement by the state governor (March 26, 2020) to the end of the

academic year for the students (June 10, 2020), a total of seventy-six days, not all of which were designated school work days. The people included in this study are members of the GMS community. The members of my defined community all live in the local area of a medium sized city in the Southeastern United States.

Recruitment

For this research dissertation I have used snowball recruitment. I asked a few colleagues (reflexivity statement) whether they were at GMS during the COVID-19 lockdown. I then asked if they knew of any other faculty members who were there during that time. The huge staff turnover at GMS provided a small but sufficient pool of participants. The snowball policy reinforces the social movement and social aggregates part of my theoretical framework. By recruiting people who know people because of their interactions I have reinforced the idea that the leadership events are caused by resonances of social interactions. I also asked several families and parents who had students at GMS during the pandemic if they were willing to take part in my research but none of them responded positively. The social groups, who can identify participants from within their aggregate, have produced a resonance among themselves.

Data Generation Methods

During my research I interviewed two administrators, five teachers, three support staff and one paraprofessional, which produced theme saturation. Analysis of the interview data determined that this was sufficient, and I did not need any more participants. I was not attempting to produce reproducibility in my study or to find a representative sample from within the population, instead I intended to understand the phenomenon of leadership within the community during COVID-19. Employing a constructivist approach to this study I want to co-construct knowledge with the participants employing "particularization not generalization"

(Stake, 1995, p8) with the use of intensity sampling. Small numbers of deliberately chosen participants is appropriate (Small, 2009). To re-enforce this, I conducted semi-structured interviews with faculty, staff and administrators providing a fully holistic understanding of the situation. I also interviewed the principal and the eighth-grade assistant principal.

Interview Questions

My interviews used a semi-structured, ethnographic style interview format. Before conducting semi-structured interviews, the interviewer prepares a list of topics that need to be explored and designs potential open-ended questions around these topics. Generally, this list was followed during the interview but there are also opportunities for conversation to be developed, based on the answers given, that develop and illuminate areas of interest in ways that the interviewer could not have anticipated when the interview was being planned (Brown & Danaher 2019). I did this using grand tour questions and specific grand tour questions detailed in Spradley (1979). A list of my proposed interview questions is in Appendix E. My questions are obviously influenced by my observations of the changes that I observed as a member of faculty (see reflexive statement). For example as a teacher one year later I was still seeing the rapid provision of training to support the introduction of Schoology software and zoom for meetings. Throughout the process I remained reflexive to fully appreciate that participants may not have seen these changes at all or may feel that they were insignificant in comparison to other issues. This experience does mean that if conversation stalls, I can specifically ask about a change I observed to see if this stimulates other linked memories.

Before I began each interview, I made it clear to all of the administration personnel that I interviewed that the decisions they made were taken at a time of crisis and they were made in good faith by professionals who took the pulse of the situation and acted accordingly. I

reinforced that this research is not intended to be a debate to decide if the leadership decisions can stand the test of time and formal analysis. There has intentionally been no juxtaposition of the on-the-spot decision-making process and the "after the fact" analysis.

Post-Activity Data Management

Data was stored within the Auburn University data protection Framework, Box, and complied with IRB requirements.

Limitations

Due to administration time for the IRB process from the sponsoring University the research was carried out approximately twelve months after the event. In contacting and talking to possible interviewees and participants for the study (see reflexivity statement). I requested that they save any emails they wrote to try and preserve data. This helped with the problem of not remembering details from the event and the inevitable problem that recollections vary. The interviews helped the interviewees remember but were not specifically helpful to the research.

Data Analysis

Quantitative research prides itself on producing work that uses unbiased sampling which yields results that are representative of the population; the statistical error in this goal can actually be calculated as a physical number. If other forms of research are judged by these criteria of representation and average sampling, they fall short and are negatively criticized, but, as Small (2009) points out, this misses the point and the value of the alternatives. Many quantitative researchers would, and have, argued that the lack of generalizability leads to a lack of rigor, but they seem to be missing the point.

There is disagreement within the qualitative researchers as to how to validate case study research. Burawoy (1991, cited in Small) argues that instead of statistical significance (a phrase

that has a specific mathematical definition) the case method searches for societal significance; instead of comparing cases and looking for representative comparisons, the single case, he argues, provides information about society as a whole. Alternatively, Mitchell (1983, as cited in Small) argues that the key to qualitative research is in its ability to uncover processes within the case being studied. To the foundational quantitative research question "how do you know the case you have chosen is typical?" he answers that statistical representation is an "irrelevant criterion" and that inferences from statistical data are entirely different in nature from the study of a "idiosyncratic combination of elements or events that constitute a case," which he refers to as scientific or logical inference. Small (2009) surmises that sampling logic, or a mathematical approach, is only superior to case study logic when the questions being posed are descriptive questions about populations. The how and why questions, that address the details of a process that are unknown before the research begins, are best answered by case study research. This reflects Yin's (2003) research question development strategies of finding the "how and why" as opposed to the "what."

Stake's (1995) constructivist outlook reinforces Mitchell by identifying the aim of research to be to construct a clearer idea and better description of the realities of the world as seen through other individuals and their interpretations of how these experiences integrate into a world view. Stake (1995) also identifies the many roles of the researcher: teacher, advocate, evaluator, biographer, and interpreter, which would all be scorned by quantitative researchers who aim for impartial observers.

Using the interviews and personal observations, my main analytical technique was to construct an understanding of the changes the interviewees are describing and then I have built an understanding of the emergence of a leadership event within the bounds of my theoretical

framework, showing the resonance of aggregates and the emergence of a leadership event

alongside the roles of the traditional leadership play in the event. In this way I have shown face

validity and ecological validity (Yue, 2010). Face Validity represents an "intuitive and

commonsense understanding of a phenomenon" (p963) and ecological validity ensures that the

researcher's inquiries resemble the lived experiences of the participants. I may be able to

triangulate data sources (Evers & van Staa, 2020) to provide internal consistency (Ward & Street

2010) by cross referencing emails and interview identified experiences, with documented

changes in policy from administration.

I also looked for pattern matching (Yin, 2003) – comparing the empirically based pattern

with the theoretical pattern of CLT which Yin may also describe as logic model technique. An

interview may reveal that, in response to administration encouraging feedback, through a

community wide communication, that appeared in the data sources, a stakeholder wrote an email,

which subsequently resulted in a perceived change in policy towards a specific aspect of the

online education platform. Pattern matching associates the actions of the administration's

encouragement to the conceptual framework of complexity leadership; it also follows the actions

of the stakeholder and places the events into a framework which demonstrate emergence and the

existence of a leadership event. The possible interactions between stakeholders discussing

whether to write the email can also be fitted into the framework with pattern matching (Yin,

2003). Other data sources, outside of interviews, can confirm a decision and a policy change but,

stakeholders who believe policy changed because of their intervention, are an example of an

emergent leadership event in the same way as documented changes.

My a priori themes for coding the data gathered were based on the leadership functions:

Administrative, Generative, Community Building, Information Gathering, and Information

Using. I started my analysis by reviewing my interviews and identifying the main themes that emerged. These themes represented the key ideas, patterns, or concepts that recurred throughout the conversations. As I read the transcripts it became clear that the interviewees were describing several of the same incidents or leadership events from different perspectives. Discipline, within the virtual environment, became a prominent theme alongside absenteeism and communication. Communication sub divided into communication between teachers and administration, between teachers and teachers, and between teachers and students. I also considered how one emergent event might influence or be influenced by another. I analyzed the described experiences and roles of the interviewees in the leadership events that emerged in each themes and assigned one of the four leadership functions to the phenomenon. The leadership functions represented the roles or purposes of each experience in relation to my conceptual framework and provided a description of the event in terms of complex leadership functions and my conceptual framework.

Verification and Interpretation

Referring to the four tests of validity proposed by Yin (2003, p43) during my research I ensured the following:

- Construct Validity – I used multiple sources of data and have key informant member check (Yin, 2003)

- Internal Validity – I performed explanation building in order to ensure that the relationships I describe in my research are actually related to complexity theory leadership as the primary dynamic (Yue, 2020).

- External Validity – I am employing CLT theory but am not expecting to have generalizability to all future situations. Remembering that the generalization comes from the case study and not the case (Yin, 2003).

- Reliability – I have developed a database and maintain a chain of evidence for example who recommended participants

To reinforce my trustworthiness as a researcher I have remained reflexive considering my involvement with the community. By acknowledging my part in the process, I hope to detach from it sufficiently to report it. My participants were asked to member check summaries of the interviews which were be deidentified by the researcher. With enough data reported the reader should be able to reach their own conclusions and make their own decision as to whether they agree with my interpretation. I used these validation strategies to show the study's trustworthiness and credibility through the lens of the researcher, participants, and the audience (Creswell & Miller, 2000).

Through several different data sources, I was able to perform data triangulation to confirm that observations and conclusions carry the same meaning when found under different circumstances (Stake, 1995)

Ethical Considerations

The ethical principles of research are not always well-defined and their interpretation is left to the individual researcher and the IRB board of the overseeing institution, however, Hammersley (2015, as cited in Brown and Danaher, 2019) summed up the essence of ethical considerations by saying: "respecting people and taking account of their well-being' should define research ethics" (p. 78). I conducted my research following the principles of Connectivity,

Humanness and Empathy (CHE) which were inspired by Reushle (2005) and are extensively detailed in Brown and Danaher (2019).

Ontologically, the CHE principles are based on the importance of human interactions in social groups which agrees with the theories of aggregate resonance in my conceptual theoretical framework of Complexity Leadership Theory. Epistemologically CHE recognizes that knowledge is co-constructed "in environments that foster dialogue and engagement and that help to scaffold learning and reflection (such as via semi-structured interviews)" (Brown & Danaher, 2019, p. 78), This reinforces both my data collection technique and my conceptual framework using the information-gathering and information-building leadership functions. Axiologically, the CHE principles ground themselves in the ethical position that values difference and otherness (Brown & Danaher, 2019), aligning with the fundamental need for heterogeneity in a complex adaptive system.

Connectedness: refers to creating a rapport within an interview. Rapport means more than putting people at ease; it involves listening, and convincing people you are listening and that you are interested in them and their story (Leech 2002). Specifically, interviewers should have physical gestures that reflect openness and a friendly approach (Brown & Danaher, 2019)

Humanness: As part of the epistemological constructivism inherent in this approach participants and researchers are both givers and receivers of information. Researchers are encouraged to express rather than suppress their humanity (Brown & Danaher, 2019).

Empathy: In considering the feelings expressed during an interview there must be a mutuality and a determined willingness to "appreciate the perspectives and world of 'the other'" (Watts 2008; see, e.g., Dennis, 2016, as cited in Brown & Danaher, 2019, p. 83).

Using these principles as a guide the ethical protection of the interviewer and interviewee are considered. All interviewees were given the opportunity to member check the interview summaries and were given the opportunity to withdraw from the research at any time. I created pseudonyms for all participants but during the analysis I avoided using any identification.

Chapter 4: Findings

The first three chapters of this dissertation offered an introduction into the circumstances of the COVID-19 global pandemic, and the resulting national, federal and local governmental responses; a review of the literature concerning the various academic frameworks that have been proposed for complexity leadership theory; and the methodological design that was used for this study. This chapter now presents the findings that emerged from the data collected and analyzed using the conceptual framework that was constructed for the purpose of this study.

Within the uncertainty of changing environments researchers have developed ways to predict, measure, and understand community behavior. Complex Adaptive Systems (CASs) are groups and organizations where an understanding of how the individual components operate is

not a direct predictor of how the whole reacts to a situation. There is an element of circumstantial

unpredictability that cannot be fully understood until after the event has been observed. The

system is an evolving structure which reorganizes and adapts according to the unique

environmental conditions of the moment. (Chiva, 2014, as cited in Turner & Baker, 2019; He et

al., 2011; Manson, 2001; Morrison, 2006; Stacey, 1996). Viewing communities as Complex

Adaptive Systems (CASs) is a way to view groups of people who are isolated in a semi

permeable way, within a larger community and to describe the interactions between individuals

and groups. My example was Gregory Middle School (GMS), a Title I middle school in the

south-eastern United States. GMS is part of McMillan Public School District (MPS). I have used

MPS and GMS as pseudonyms to anonymize the school system and school throughout this

dissertation.

Statement of Purpose

This is an instrumental case study (Stake,1995) to show how a semi-isolated school

community handled the change from traditional classroom-based school to virtual school in a

short amount of time due the COVID-19 outbreak of 2020. It explores how this radical social

adjustment for the community, shaped individual interactions between the school administration,

faculty and staff during this time. It proposes that these interactions within the community can be

better understood using a framework built on complexity leadership theories (Morrison, 2006).

This is a qualitative study employing an instrumental single case study (Stake, 1995) that

was conducted with data collected from interviews and document collection (Yin, 2008;

Merriam, 2009). Pseudonyms for the school, the school district, and all the participants in the

study were created to ensure as much anonymity as could be reasonably afforded to them, although within this writing I have simply avoided referring to anyone by name rather than giving them an alias. The findings from these interviews and gathered artifacts have been presented using the complex leadership mechanisms of Administrative, Generative, Community Building, Information Gathering and Information Using, as a structure to describe the case. Unlike other case studies that attempt to explain the situation, this study provides an understanding of how the complex leadership functions were involved in the decision-making process; this understanding is connected with an intentionality to truly comprehend the situation which simple, superficial, third-party explanation is not. This case study does not work to explain *why* things were the way they were rather it describes in depth *how* things were at a particular time and place (Stake, 1995). This contrasts with case studies seeking to identify cause and effect relationships and those, like this study which are seeking understanding of the human experience.

Significance

The nature of education ensures that schools are never going to stop changing, adapting and trying to provide the best for students within an ever-changing political environment of new legislation and bureaucratic measurement systems. The COVID- 19 pandemic is unlikely to be the last time that a catastrophic global event effects schools and students. Understanding how a high school community operates as a complex adaptive system in extreme circumstances can help us better understand leadership and school communities, for the future.

Problem Statement

Preparing for and managing change is an area of intense research within the academic area of leadership. And, if this is true for business and commerce, it is doubly true for schools

and education. How, then, do leaders of communities, like school districts, handle a massive change that was totally unpredictable and groundbreaking in its consequences? What can we learn about community interaction and leadership roles during radical change? While complex leadership theory, using complex adaptive systems as the central tenet, has been developing for some time, educational references to this theory are not as fully developed as in other fields. Complexity leadership theory has been studied in a school leadership environment (Morrison, 2002) but not through a case study and not in an environment identifying a specific community and the theory together. This case study, of an educational community, undergoing massive change and uncertainty, using complex leadership theory as its conceptual framework, examines these questions and the implications for school communities and their traditional, administrative leadership roles. This study uses five functions of complex leadership theory to describe the community interactions and leadership roles during radical change. It also describes the emergent leadership within the GMS community and how it was both simultaneously encouraged and controlled using the generative and administrative functions

Conceptual Framework

Complexity leadership theory has developed from complexity science where systems are described as non-linear and non-reductionist (Chiva, 2014, as cited in Turner & Baker, 2019). Leadership is described in terms of events and is not assigned to an individual person or group. The unpredictable interactions of individuals described in complex leadership theory (CLT) fits well within an educational community environment where there are many diverse stakeholders who all have distinct and individual needs from the system. I have combined several structural frameworks from the literature (which are not from an education leadership discipline) and created a theoretical framework of complexity leadership. The four functions of leadership which

I have used for the basis of my analysis are the administrative function, the generative function, the community building function and the data collection and data analysis function. Understanding the complexity of a system and the interactions between the individuals involved is a matter of perspective or framing and the level of decision making that it influences (fine and coarse grain activities) (Stewart, 2001).

The Administrative leadership function within complex leadership model, is used to by building leadership to produce stability and a cohesive work environment that give some necessary reassurances when the system is working at the edge of chaos (Hazy & Uhl-Bien, 2015). Administrative groups provide procedures and goals giving boundaries that give familiarity and encouragement. The regulations and procedures put in place to facilitate smooth daily operations and provide boundaries, as well as limitations and rules for staff to work within, provide security, and reassurances.

The Generative leadership function (Surie & Hazy, 2006) influences the fine grain procedures and provides details and influences the minutiae of the everyday processes. Building leaders encourage the generative process by providing the environment for aggregates to form and develop. These groups can then resonate and problem solve through experimentation and experiential development. The processes cannot be intricately managed (Uhl-Bien & Marion, 2009) with the goal of the emergence of leadership events. I have analyzed absenteeism, student access to technology, and communication problems and solutions implemented by the faculty and admin that demonstrate this function in practice.

In order to try and enable emergent leadership events traditional leadership positions use community building as a leadership function, reinforcing and encouraging a sense of belonging at the fine-grain level. Coarse grain processes arise from these smaller interactions and as

community building leadership is applied, individuals operating at a fine-grain level begin to acknowledge membership in the larger community. This belonging to a community reinforces both the generative function which is reliant on aggregate formation, and the administrative function which is reliant on buy-in to the system and participants following the rules.

The information-gathering and using functions are not the sole possession of the administration and shows that there are uses of information at other levels of the system. The information available to teachers can be used and distributed throughout the aggregates to develop fine grain processes. Conversations between teachers both in person and through social media produces data that is then "sensed, decoded, exchanged and interpreted" (Hazy & Uhl-Bien, 2015, p. 85) in an informal way. Administration may need a more formal process for gathering and ultimately using the information.

Research Question

How did the decision-making processes of traditional leadership roles change through the interaction of the four functions of complex leadership theory in a Title I middle school, in response to the COVID-19 crisis?

The interviews I conducted point to a difficult balance between the administrative and generative functions of complex leadership, that the principal and other administrators needed to find during the pandemic led closure of schools. The interviews identified that the decision-making processes of the administration changed to fit the requirements of the faculty and staff in the building, and the teachers changed their decision-making processes in the classroom to fit the new and developing needs of their students. The administrative function gave teachers structures to work within, providing security and boundaries that calmed nerves and

provided them with the reassurances they needed to do their jobs. The Generative function allowed them to adapt, within the boundaries set, to be more effective and to be able to better meet the needs of their students. Decisions by the administration followed the entrainment process of allowing the generative function to take precedence and then tightening the rules and regulations promoting emergence. This is seen in the formation of aggregates between groups who would not usually have that much in common personally. Older, traditional classroom teachers who had excellent in person classroom management skills, and (generally) younger more tech savvy teachers who handled online classrooms more effectively, began talking to each other and collaborating. There was a corresponding change in the balance of power between these two groups as they grew to appreciate each other. There was little formal instruction as to how to teach virtually at the beginning of the school closures, so the teachers taught themselves and each other, and then as the situation developed administration began to take more control.

The decision-making process of the traditional leadership roles also changed to accommodate the vast requirements that suddenly became apparent. Teachers changed the way they made decisions in their classrooms by considering access problems that had never existed before, and administration changed their decision-making process to allow more input from teachers and therefore incorporated more immediate feedback of policy changes. The whole system made changes faster allowing survival and imperative adaptation.

The Administrative Leadership Function

The administrative function is, by definition, the details of the policy and procedures that provide the coarse grain structures for "business" of teaching. This stands in the face of complexity leadership which encourages adaptive emerging leadership events. There is a constant dynamic relationship between the traditional leadership positions and the informally

created and complexly adaptive emergent forces. This daily opposition of the processes of emergence and entrainment, where leadership restricts and limits the progress of spontaneous changes, is referred to by Hazy and Uhl-Bien (2015) as the spiral of innovation or entanglement (Thomas et al., 2005).

For the analysis of the function, I have explored the leadership structures that influenced GMS from outside the building, the traditional administrative positions of the district and the federal government. I have then considered the influences of the administrative function on the curriculum content, what the teachers actually taught during the lockdown period, and how this was decided on and implemented. Finally, I have examined how teachers were instructed to deliver this content and the policy decisions that were made regarding it.

The Administrative Function: Leadership Decisions from Outside the Building

The decision-making process throughout the pandemic was generally not executed at the building level. For much of the lockdown, macro decisions, like the opening and closing of buildings, weren't even being made at the district level but had moved to the state level with heavy federal influence; this was unprecedented. Principals became reactionary to policy that they had had no hand in influencing. The principal commented that he wished that he had been able to keep his faculty more informed of the decisions that were being made, but that he was finding things out at the same time as they were. When I asked him if the superintendent had called him about the school closure before it was officially announced, he said:

She, she didn't say anything. Um, because the state superintendent

closed all the schools in the state…. So it was really, he, that made the

86

decision. So, there was no need for her to do anything after he, you know,

made the decision. It was still a long delay, maybe a few weeks before we

heard   anything from the superintendent's office in terms of what we

should be doing while we're closed. 'Cause at the time when he closed it,

school was   closed…for spring break. (Principal A, 2 August 2022).

With all the faculty, staff, and administration physically out of the building, communication was

difficult, and the newly imposed centralized decision making negated the already failing

localized processes. The principal said in these early days he felt like he was no longer a decision

maker, as the pandemic spread and large-scale plans were rapidly put into place. I asked a grade

level administrator how he found out that the school would not be coming back after spring

break, and he laughed as he said:

Strangely enough it was in a rumor that we were going to do it,

that's always faster, I think. Don't know if it's always true but it was

rumored that we were going to lockdown, and then would you like me to

tell you what was after that ?….We had a faculty meeting [in the cafeteria]

to discuss it with the staff and then it was on the news maybe the next

night if not that night that we were going to be closed. (Principal B, 15

May 2022)

One teacher told me that before they went on spring break her friends and colleagues

were joking saying "we're not coming back" because they were watching national news of

school districts around the country shutting down. Several of the teachers I spoke to mentioned

that they had heard that the district would be closing through the local news outlets. With the

prevalence of smartphones and immediate information one teacher told me:

So, I think it was actually the last day of school before break. So, I was checking my phone and a news alert came up on my phone that the governor was holding a news conference, and during the news conference the medical advisor and the state superintendent came out and they stood next to the governor as they announced that everything was shutting down for two weeks. The news came, not from the school, but from the press conference and we all found out at the same time…. The school didn't tell us at that point, we just shut down and went home. (Teacher B, 30 May 2022)

Almost all the teachers I interviewed remembered seeing the information on the news but very few remembered how the administration told them about the situation. Some teachers remember receiving Robocalls, while others don't remember it. One teacher told me about a detailed email from the central office with documentation of what COVID was and what cases they had had in their state - no other teacher mentioned this, and I could not find a copy.

A teacher who regularly attended the district departmental meetings said she gathered information from the poorly attended subject level meetings. She said:

Our district curriculum specialist…mentioned that we needed to make long-term plans about how to deal with the 4th 9 weeks, but she basically said in the meeting that we are probably not coming back. That was not official from the district but she let us know that we needed to start making long-term plans for If we came back. She used the word "if." So the district at that point, it was the week after spring break, were already discussing "if" but it had not passed to the principal or the school level

yet. It was just those of us who showed up to the meeting and were

listening carefully heard her say the word "if." (Teacher B, 30 May 2022)

The nurse, security guard and the custodian do not work directly for the principal but instead are contracted and employed by outside agencies and assigned to a particular building. The custodian said he knew that the lockdown was coming because he had received emailed instructions from his central office that they were to increase their cleaning levels: "they told us to do more wiping, cleaning and sanitizing." "We're usually only allowed to mop 3 out of 5 days but we were told to mop every day - we don't have enough staff for that, so when the school closed down, we had to clean all of the classrooms and all of the school" he said.

The security guard at GMS told me he knew the long-term closure was coming when he received an email at the end of his spring break, moving him from GMS to a different local school to begin preparations for a distribution point. He said it just sort of happened. He explained that he felt lots of people didn't really understand what was happening and lots of the parents he met were socially disoriented because they had no prior experiences to prepare them for what happened.

In my interview with the principal, he suggested this dissertation should be titled "Good God, we did it," showing the immense uncertainty he felt during the pandemic and the relief that, in the end, children were educated and kept as safe as possible. Trying to put coarse grain administrative procedures in place to provide structure and continuity for the faculty was difficult, as he was as new to the situation as everyone else. Tasks that had never been part of the daily routine suddenly became the main priority, and tasks that had previously taken most of his time now became almost non-existent.

There was this huge responsibility for like public health, like for the

principal to be a public health expert, to check temperatures, diagnose

symptoms and determine whether or not children have been in contact,

you know, with other people that were known to be COVID positive. And

that was not something we were accustomed to doing. It's not anything we

mind doing, but it was very time consuming. Right? So normally how I

would decide to spend my time would be broken over academics or

operations or student discipline. But now my, the way I would spend my

time, had to be changed. (Principal A, 2 August 2022)

I directly asked the principal how he thought the decision-making process changed. He

was honest in his answer; his process changed because of the sheer volume of requirements and

the way he allowed his staff to be part of the creation of the new operating procedures.

The decision-making processes changed because of additional

responsibilities being added. For example, there was this huge

responsibility for like public health, like for the principal to be a public

health expert, to check temperatures, diagnose symptoms and determine

whether or not children have been in contact, you know, with other people

that were known to be COVID positive. And that was not something we

were accustomed to doing. It's not anything we mind doing, but it was

very time consuming. (Principal A, 2 August 2022)

With so many other things to do outside of being a middle school principal, many of

which were previously unheard of, the principal felt his decision-making process was sometimes

rushed and shallow. Making a schedule not only helped the teachers with structure and security,

it also brought the principal back into familiar territory where he knew he could help his faculty and be successful. The feedback from the teachers to change the schedule gave him a reassurance that he could provide something useful and help his faculty in a time when a lot of the decision making had been taken away to district level. This interaction provided normalcy. His use of the word we in the following quote is incredibly telling:

> Every single day it seemed like, and it was just very difficult trying to
> maneuver the pieces. And I think we did an incredible job. So we kept
> trying to change the way we did it. Even in that short time span just to do
> it better. And we didn't know what we were doing. We were just trying to
> learn (Principal A, 2 August 2022)

The principal, who has a background in human resources, went back to basics and began producing scheduling for class times, trying to give the staff a firm and reassuring foundation. He helped staff organize zoom classrooms and posted the codes on the school website for them within the schedule, so it was easily accessible. The subsequent problems that came from this open accessibility have been discussed; the staff appreciated the support and the direction, even if the system wasn't perfect to begin with. They were sympathetic to the mistakes and the attempts to find working solutions. Faculty followed the schedule and provided feedback through email and personal conversations. When I asked the principal about changing the schedule he said:

> Well, it was really just more the teachers saying, "Cause they had like a
> flip schedule, like Monday, Tuesday, it would be this group and
> Wednesday, Thursday, it would be another group." So they were just

saying it wasn't enough time. The kids were falling further and further

behind…so we changed it. (Principal A, 2 August 2022)

The principal's flexibility to change timings to better fit the situation allowed the system to adapt within the feedback given, demonstrating a natural evolution. The published schedule provided a ratcheting function that prevented the program from changing back again; the changes to the system became permanent. This change in coarse grain procedures, enforced through a published and widely distributed schedule, shows the principal using the administrative function to define the chains of responsibility and provide a sense of consistency, (Morrison, 2006). It gave teachers specific times to teach and plan and gave much needed structure to an otherwise uncertain situation. Just knowing when to teach and for how long settled nerves and being allowed to give opinions on how the plan was working gave them a stakeholder role. The principal's actions provided a fine balance of entrainment and emergence where teachers could operate implementing fine grain changes, using the generative function, within the safety net of the coarse grain restrictions, of the administrative function. This example could have gone in either theme, but I chose the administrative theme to show the vital role that rules and regulations had in freeing the staff to fulfill their potential as educators. Without the schedule, and the knowledge that the feedback that they were providing was being listened to and acted upon, teachers would not have been able to successfully adapt and survive.

The principal said that in this environment he began finding self-determination in the areas he knew he could positively influence. As the teachers gained boundaries and subsequent professional reassurance from these schedules the principal also regained his personal confidence:

I could have done better as the principal leading it, but part of me just, I

didn't know what to do…I created the Zoom schedules, that's something I

could do, create expectations - something I could do. But I had difficulty

trying to monitor the quality of the virtual instruction, who was logging in,

who wasn't, um, to teach some teachers weren't logging in at all. (Principal

A, 2 August 2022)

Using these schedules as a starting point teachers began reengaging and providing

feedback as to what was successful and what wasn't. The schedule for the classes changed

several times to accommodate the needs of the students and the teachers. A tutorial session was

added at the end of the day to accommodate students who were sharing computers or those who

only had internet connection when the bus came into their community. The principal told me that

teachers began giving him feedback by text and email and he was quick to adjust the plan.

In another interview a grade level administrator also talked about his changing role

during the pandemic. He described trying to combine traditional roles concerning student

discipline with trying to help and support the faculty. When I asked him what changed about his

administrative role he said:

I was able to attend more sessions, attend more classes…I could

just open up a class session and watch and observe and so I was

able to get more observations in…I really liked it. The teaching

and the instruction was very effective and good. The teaching was

on task. (Principal B, 15 May 2022)

This encouragement was just what the teachers, who were unsure of their roles in this new

virtual environment, needed.

The Administrative Function: Required Curriculum Content

The two English teachers I interviewed talked about meeting together with other teachers in the district and discussing what should be taught in this new environment. It became obvious, they said, that not everything on the curriculum was going to get covered and so, as a group led by the district subject specialist, they identified key standards that they would concentrate on.

So, each department met and tried to iron out a plan. A game plan to try

and figure out what we were going to do? So, for us we looked at our

pacing guides and we decided - these are the most critical things that they

are going to need to know - So how do we execute this? Because

everything has to be virtual. (Teacher A, 8 May 2022)

Committees in every subject area met and decided on a set of critical standards that took precedence over the others. The insecurity and uncertainty about the requirements from virtual teaching was obvious from every conversation, so the use of the administrative mechanism here gave the structure required to let individuals come to a personal understanding of the chaos. The imposed reduction of required standards reduced the workload and gave the teachers time to breathe and reassess. Official emails from subject specialists at district level informed teachers of the new priority of the key standards and gave the limitations demonstrating the entrainment function; teachers became able to freely practice their craft within the limitation given. This administrative function action did not come from the principal but from district level leaders.

The Administrative Function: How Teachers Delivered Instruction

The instructions for the provision of alternative learning environments were not solely dictated by the building administration. Soon after the governor's announcement, that schools would remain in a virtual environment until the end of the academic year, the state

superintendent acknowledged that districts across the state have "different levels of capacity" to do online learning. In an unusually specific statement about teaching methods, he said, "Where no connectivity is possible, they'll offer 'old-fashioned' take-home packets." The direct result of this was that, while trying to understand the new technology, teachers were also required to produce a paper packet that could be handed out to students who did not have access to technology. Again, the building administration tried to control the uncertainty by providing entrainment and organizing the details of distribution. Administration set limitations on the size of the packet, and deadlines were given to facilitate timely distribution. The limitation on the key standards had been set. These measures, providing tangible parameters, certainly helped, but teachers struggled with not having any contact with their learners.

> Packets were more workbook stuff; I mean I tried to … The problem is we were handing out these packets to give to a student. And they're going to have no interaction with a teacher so we can't make it very difficult, because they have no way of getting comprehension or understanding from it. It's not like they can ask me a question. I mean they could, but they're probably not going to call up here and say, "hey I'm having trouble." (Teacher C, 21 May 2022)

Security and custodians helped with the logistics by handing out and collecting papers, and office staff photocopied and collated the bundles into year groups. The custodian stated, "we just wanted to make the teachers feel comfortable," so when the principal asked him if he could help, he did. The principal controlled the process using entrainment; he had to restrict the teachers so that the administrative processes could work. Individual teachers could not see big picture logistics. The principal said:

It was all very complicated because each team started developing their

own packet. And I was like, "no, we need one packet for sixth grade, one

for seventh, and one packet for eighth." Teachers did not like that. The

assignments were not individual to the teacher. And I just said,

"unfortunately, it's too complicated. And we have limited staff." They took

all of our security guards except one. So that one person had to sit, sit at

the door all day and take packets and give out packets and all that. And I

just didn't have the personnel to sit through all of that complicated mess.

(Principal A, 2 August 2022)

The teachers were not happy with the restrictions that were placed on them and

complained to the principal personally at the time, but the policy was necessary for the smooth

running of the school. The administrative function of leadership is not always based on popular

decisions. This set of restrictions was implemented to facilitate the whole school. The principal

used the word "mess" to describe the process, showing the frustration and discomfort throughout

the system.

In conclusion administration used coarse grain policies and regulations to control some of

the behavior of the teachers. The curriculum content, which would otherwise become

overwhelming and impossible to teach, was slimmed down to essentials only, giving teachers the

opportunity to actually succeed. The methods of virtual teaching were new and had to be given

restrictive parameters in order to maintain the complicated logistical balance between teaching

faculty and support staff. The decision-making process was not linear, and the administration felt

a significant amount of jurisdiction had been taken from them, so they tried to help faculty and

staff with what little influence they had left.

The Generative Leadership Function

Generative Leadership mechanisms are described in three phases. At the beginning of the process Plowman et al. describe coarse-grain disequilibrium provided in my research by the COVID pandemic (2007a, 2007b; Lichtenstein & Plowman, 2009). The administration then demonstrates organizational support for any innovative ideas and new thinking. In the second phase, administration encourages the implementation of the new ideas that have been formed through the aggregate communication. Finally, the feedback from the fine-grain changes at a subject or grade is encouraged by open and accessible administration. In conclusion, generative leadership functions are positively correlated to the success of the emerging leadership events and produce new coarse-grain procedures (Hazy & Uhl-Bien, 2015).

During the analysis of my interviews two main themes demonstrating the generative leadership functions, absenteeism and online discipline, became apparent. Absenteeism was cited by several teachers as a problem that was negatively affecting the effectiveness of their instruction and, ultimately, the students learning. On closer investigation however, absenteeism was a symptom of several other situations that needed to be addressed. The adaptive and innovative way that teachers examined and began to understand the difficulties with the underlying issues of student access to technology, the social responsibilities of the students and the communication problems between the school, the students, and their parents, demonstrate this mechanism in practice.

The Generative Leadership Function: Addressing Absenteeism

After the novelty of the first couple of weeks of virtual school had worn off, attendance to the designated lessons became very low. Interviewees had many thoughts on why attendance was so bad. Some blamed access to technology, including internet access and physical devices, while

some blamed social circumstances that precluded students from attending class. With chronic

absenteeism strongly associated with failing at school teachers knew they had to counteract the

trend as soon as possible. I am going to look at each one of these areas and consider how the

generative leadership function was used to develop solutions; how aggregate groups formed and

came together to produce innovative ways to help their students succeed.

The Generative Function: Addressing Absenteeism Through Access to Technology

A grade level administrator estimated that about 50% of the student population did not

have access to suitable technology at the beginning of the pandemic, so trying to equitably

distribute Chromebooks became a major task of the first couple of weeks of virtual schooling.

Consistent with the generative mechanism for complex leadership, identification of students who

needed technology and the distribution of that technology was a fine grain (grass roots),

aggregate-led process. With the librarian in the lead role, custodians, security, and secretarial

staff informally came together to create a distribution plan that involved borrowed tents

(temperatures were beginning to rise and this is the south) and a highly choreographed drive

through for parents. During a socially distanced staff meeting in the cafeteria, teachers were

asked to volunteer to help with allocation of computers. The principal used the

aggregate-developed plans and implemented administration logistics to facilitate its success. The

level of detail was immense; pens were disinfected as they were used, and social distancing was

maintained as the school distributed every computer possible to the community.

> And then we had exhausted our supply. The principal had told us before
>
> COVID hit that he had ordered a bunch of Chromebooks to get delivered
>
> in the fall, so that we would be one to one in the fall, and so he had placed
>
> his order before the mass of other schools had ordered their Chromebooks,

so that was great foresight from him. He had no idea this was going to happen, but we were still caught up in the delays. (Teacher B, 30 May 2022)

The computers had been ordered, to help with the increase of students, before the pandemic, but supply chain issues slowed down delivery. The district distributed the computers they had centrally to the schools - yet there still weren't enough computers. The shortage of devices certainly contributed to the lack of participation, but the access to technology problem was not just physical Chromebooks. Many families didn't have access to a reliable internet connection, thus making the school issued Chromebooks useless when students couldn't connect to the web. Additionally, even if a family did have a Chromebook, there were significant numbers of students with siblings at home who needed almost simultaneous technological access; one Chromebook was not sufficient for a large family, forcing families to pick and choose who completed lessons with their limited resources and limited access.

The Generative Function: Addressing Absenteeism Through the Understanding of Student Social Situations and Responsibilities

There were students who, because of institutional closures across the board, including daycares, preschools, and senior centers, became daytime babysitters for their younger siblings and carers for older relatives during the pandemic. These students could not find time during the day to log onto school work. One teacher said he had kids feeding babies and making sandwiches for younger siblings all while he tried to teach. There were also some students who just didn't log on at all and teachers didn't find out why until later. One teacher described her frustration at the situation:

There were students who weren't participating at all because there were

entire households that had COVID and so we had no communication from

those parents, or no communication at all because mothers and fathers

were in the hospital. Some parents passed away; some grandparents

passed away. Parents were dying, parents were focusing on taking care of

the grandparents, more so than virtual learning. (Teacher D, 1 May 2022)

This is representative of national research done that shows communities of color; when data are

adjusted to account for differences in age by race and ethnicity black communities and other

minority communities experienced higher rates of COVID-19 cases and deaths than white people

(Hill and Artiga, 2022). As Maslow's hierarchy of needs predicts, students couldn't focus on

school work and learning because their basic needs of safety, including personal safety and

health, were not being sufficiently met. While school work and education were obvious priorities

for teachers and administration, students, and their families, struggled to make sense of the new

situation and prioritized family survival over school.

The Generative Function: Encouraging Emerging Leadership Events

All of these factors, of limited access to technology and the social responsibilities and

situations of students, added together and created the observed chronic absenteeism. Teachers

began to construct their perception of reality through their interactions and experiences. They

then explained their thinking to one another by storytelling, creating and developing their own

unique models and theories (Drath, 2001, as cited in Lichtenstein et al., 2006). Two individuals

who experience the same event each will construct the event and consequently react completely

differently from another. This resulting diversity and heterogeneity among individuals as they

form aggregates is imperative for a complex system to develop and leadership events to emerge.

Several different solutions were suggested by different groups until the fine grain procedures produced the required outcomes and then they were shared to administration and other aggregates.

The synchronous lessons became less well attended and teachers began trying to sort out why within their own cohorts and groups. Using the aggregates, they had formed to create solutions to the problems they were encountering, the teachers began by trying to identify and understand the specific problem they were facing, so they began to reach out to their students to find out why they weren't coming to class. Different aggregates solved the information problem in different ways. Some divided the absentee students into home rooms and created smaller lists to individual teachers to call, dividing the workload; some teachers I interviewed called all their students themselves, knowing they had a previously formed relationship that would help them communicate. Either way teachers began to develop a picture of why students were not showing up. One teacher describes a conversation with a parent about the fact teachers hadn't seen her son in class for a while:

> Sometimes it was, "I didn't know he wasn't logging in. When I left home,
> he was awake. He was dressed in his school shirt, and he was sitting at the
> computer. I didn't know he wasn't logging into school. I know he was on
> the only computer." (Teacher A, 8 May 2022)

But using the computer software Go-Guardian teachers could see the screen of the school issued computers and the teachers could help parents explain this mystery:

> I'm looking at Goguardian because he's using a school-issued computer. I
> can see he's on YouTube, he's on Facebook, he's been on the computer all

day. He just hasn't logged into anybody's classes. (Teacher A, 8 May

2022)

During the online classes, however, something interesting began to happen. One teacher

explained:

Students began advocating for other students and trying to solve the

problems themselves by talking to the teachers.

The Generative Function: Producing Communication Solutions

Teachers began creating an understanding of the problems their students were

encountering, and now they could start finding solutions. The administration's organized

schedule times stayed, but teachers began offering drop-in times "like office hours" for students

who couldn't come during class time. Individual teachers began learning how to record their

classes. As the lockdown progressed, they began sharing these skills with each other so that

lessons come become partially asynchronous. At the time there was no formal training as to how

to record and post classes; all of this was done by the teachers in their aggregate groups

experimentally trying to solve the attendance problem they were experiencing. This became

invaluable, later in the pandemic, as the district began running mobile WiFi buses, and providing

free internet connections, that went into communities at different times of the day. Students

began letting the teachers know what time their bus was due in their community and

consequently when they would be able to log on. The teachers produced enabling conditions that

directly facilitated asynchronous learning outside of the official times laid out by administration.

Teachers didn't just stay within their own school aggregates; they were sharing information

across schools and across age groups. One teacher I interviewed has a husband who is a teacher

at a local high school, and so she became a conduit for information from his school to hers:

So, I had a few kids saying that they couldn't log in until later in the day

because of those reasons because the bus didn't come over there until a

certain time, so that's when some of us started recording our lessons. I

learned that from my husband and some other high school teachers. They

were actually recording their lessons for that reason. So, I learned how to

record lessons from him." (Teacher A, 8 May 2022)

While communications with students increased, inter-staff communications were

hampered by the difficult staff relationships from before the pandemic. Without traditional phone

trees or staff directories (neither of which were available at GMS because of the high number of

staff turnover and the cost of constant reprinting) teachers had no way to informally contact each

other. Several teachers told me they had left the building for spring break without any other team

member's phone number. The groups that began to form then were born from the pandemic and

the interpersonal communication that underpins all of the discussions of the generative

mechanism.

The Generative Function: Addressing the Discipline Problems

As the school slowly and, in most cases, reluctantly moved from what most people

thought would be a short lived break for a passing virus into a total upheaval of the way school

was conducted, administration at GMS began to put processes into place that would facilitate

virtual learning. A lot of the original organization was done at the administrative level but then

teachers were given the freedom to operate within the structure given. One teacher sums it up

when she said:

Like I said, [our principal] is very different from other principals. And

with him being told we were going into a virtual environment, with his

background in loving HR, and being able to schedule things very easily,

GMS had a schedule for virtual learning. The second thing we had to do

was set up a zoom meeting for each of our classes. And so from there he

placed our zoom passwords into that schedule so that parents could follow

it, and then the next thing he did was upload that schedule, that zoom

information, onto the website so that parents would have access to it.

(Teacher D, 1 May 2022)

Administration thought they were facilitating the learning as they published the codes for the

classes on the school website. Students began sharing the codes with each other and then posting

them on their Instagram accounts and snapchat. To give as much access as possible to students,

they were permitted to use any computer account they had access to. These decisions were all

made in good faith with accessibility to learning as the priority goal. The teachers soon realized

that it wasn't just their students who wanted to come into their virtual classrooms. The

availability of the codes meant anyone from anywhere could access GMS classrooms and

lessons. There were moments where teachers were uncomfortable and scared, as one teacher

described:

During those class times we would have inappropriate videos pop up, we

would have someone stand up looking weirdly…that was very frightening -

and just take over your screen. We had students who were actually taking

over the teachers' screens because we didn't have the proper settings for

Zoom. (Teacher D, 1 May 2022)

These weren't GMS students - these were individuals from outside the school who were purposely disrupting middle school learning by intimidation. There were also less threatening invasions from students from other schools and at times the teachers were totally bemused:

> I had students from, Caucasian students, from other schools, who would sit in my class with their hoodies on, eating, ignoring me, because they weren't my students. And I'm like wait - who are you (laughing). (Teacher D, 1 May 2022)

Some of the veteran teachers who had very little experience with online work described shutting the whole classroom down immediately as they texted the principal for advice. They used the words "scary" and "unnerving." However, some of the younger teachers, some of whose college work had been partially online, took a different approach. One teacher with a master's degree in educational technology immediately recognized the impending problems and blatantly defied administration policy in order to protect her students:

> I locked it down. They told us to open it up, and I said "I'm doing this one time." They said we had to open up the waiting room … kids couldn't figure out how to log in, they were using their parents' devices, and so they weren't logged in to [school accounts]. So, we couldn't have a waiting room on, and so then we were told, "No, you have to let everybody in. You can't have a waiting room." I allowed it one time, and I said you know what, I'm not getting in trouble for this and I locked it down again. I did not turn off the Whiteboard fast enough, I got one "rocket ship" through. (Teacher B,30 May 2022)

When I asked this teacher what they did when the student drew the phallic "rocket ship" on the Zoom whiteboard, she calmly said, "I threw them out of the meeting." The traditional teachers who were good at physical classroom management were not necessarily the ones who understood the details of Zoom discipline, and so aggregates began to form around the tag of virtual classroom security. Teachers who understood the implications of a virtual classroom openly defied the administration and locked their classrooms down, enforced waiting rooms, and implemented an effective "behave or out" policy. Within their aggregates, they spoke about their experiences to other teachers who were obviously shocked from their unwelcome class invasions. The fine grain procedures gradually changed; at first this was by word of mouth and teachers copying each other's policy. As each teacher suffered an embarrassing incident in their virtual classroom, they turned to their aggregates for solutions. Individual by individual the building unofficially began using waiting rooms and encouraging student to us their school given email for access. By the beginning of the next academic year (2020/2021), the faculty were given comprehensive training on Zoom meeting security, and all classrooms were required to have a waiting room where class participants could be vetted before entering.

Alongside this teacher managed issue administration also changed their approach to dealing with the perpetrators when the problem was reported to them, usually after several violations. I asked one of the grade level administrators how they felt their role changed, and they said immediately that discipline infractions and the way they dealt with them changed dramatically. New ways of dealing with disruptions had to be conceived:

> We would restrict their access. They could not go on, and it was usually
> something disruptive to the virtual class. So, we would block them, kick
> them out and, strangely enough, it was effective. I say "strangely enough"

because if you're acting like you don't want to be there and you get put

out, it's almost like that's what you want right there, but it was effective.

(Principal B, 15 May 2022)

Similarly, there was genteel anarchy among the teachers about the use of cameras installed in the Chromebooks. From the beginning of the virtual schooling, the administration insisted that students should have their cameras on while they were in Zoom meetings. This caused a lot of teachers to be anxious. One veteran teacher tried to explain by describing parents who were oblivious to the cameras in their homes and the problems that could arise; another teacher described some of her students being visibly embarrassed about their surroundings. The visual snapshot into students' lives at times felt invasive and many teachers thought unnecessary, so teachers slowly stopped insisting that students turn on their cameras. The policy of cameras being required is still in place even after COVID for any virtual work, but most teachers do not adhere to it. The coarse processes and administrative rules have not yet been influenced by the fine processes that are being practically implemented by the teachers in the virtual classrooms.

Integration of Administrative Function and Generative Function

In conclusion, the generative process allows teachers to use their experience and ingenuity to solve problems at the fine grain level, subsequently influencing coarse grain policies and procedures. The "coarse grain administrative procedures" are a part of the administrative function and act in parallel to the "fine-grained administrative procedures" in the generative function. The difference between "generative" and "administrative" in terms of traditional leadership positions is that one is bottom-up and the other is top-down.

The security provided by the administrative function enabled staff to experiment within the parameters given and expand their professional practices using the generative function. The

dependability of a class schedule meant that staff could use the boundaries to set a baseline of expectation and then begin to expand within the dictated parameters where they thought it was appropriate. Knowing that they had a "safety net" of a minimum expectation, teachers were allowed the freedom to develop a system that was more appropriate for the students who had technology and social issues and were, up until then, unable to come to class. In a self-effacing admission the principal described the enormous task of trying to harness the forward-thinking developments of the technological savvy teachers while trying to encourage and guide the teachers who were struggling:

Some teachers can't even turn the damn computer on…I could have done

better as the principal leading it, but…I didn't know what to do. Um, for

some of this I created the class schedules; that's something I could do.

Create expectations - something I could do. (Principal A, 2 August 2022)

The mechanisms of the two functions helped the principal to guide the teachers who only needed minimal instruction and provided rules and restrictions to teachers who needed even the minimum requirements defined. This led to students being better served by teachers who were allowed freedom within the boundaries and students at least receiving minimum services by those who were struggling.

The librarian also showed the balance between the administrative and generative functions when she ordered her first e-books. She was given the budget autonomy to adapt her reading materials to fit the situation during the building closure and now the library at GMS is majority eBooks with policies in place for students to borrow using their issued devices. The fine grain adjustments during COVID have become coarse grain policies. The ratcheting function prevents returning to old fine grain practices through new administrative rules and documents

enshrining the new procedures. This means that the coarse grain procedures developed are permanent and the library will not return to the way it previously operated. In more general terms individuals (the librarian) have worked to provide stabilizing feedback and bring the system back from the edge of chaos (no books for the students to read) to dependability (a library of available eBooks).

Community-Building Leadership Function

Within a school there are several overlapping groups who are referred to as communities. Each individual classroom, be it real or virtual can be considered as a community of students. There is a simultaneous community of the school, students and teachers and the immediately connected parents. The wider community of schools within the district branches out into the larger community of the city including churches and grass roots community groups. The community building leadership function applies to all of these groups, encouraging participation across the groups and ultimately producing emergent leadership events.

Community-Building Function Centered Around Classroom Communities

In the face of detrimental student absenteeism, teachers began finding ways to build the community of their classrooms to encourage students to attend virtual classes where they could. There were several different approaches to this, but the vast majority of them involved physically phoning students and their parents to make as much of a one-to-one connection as was allowed within the pressures of the isolation of the pandemic. The teachers at GMS do not share their phone numbers outside their personal contacts and everyone I spoke to used the Google voice app to disguise their private number.

Connections and communications during the pandemic were not traditional. Formal channels of communication traditionally used by the school system were shown to be outdated. Parents and staff began using more informal platforms that were traditionally used between informal friend groups. One teacher told me that a mother had Facetimed him out of school hours, and he had initially felt very uncomfortable taking her call. He stated. "Why was this lady calling me using Facetime during the evening?" It turned out that the parent considered Facetime a way of connecting with her friends when she needed information, so when she became desperate for information, she did not consider Facetiming a teacher any different. The parent needed to know how to access her child's email, and the only contact she had was his phone number. (He was uncomfortable and unsure of how the parent had obtained his number). Ultimately, however, he described the satisfaction of helping her find her child's email and helping her understand the virtual school schedule. He proudly recalled that the student attended classes from then on because he had made that family connection. This demonstrates how unprecedented conditions pushed teachers and families past previous social norms and barriers in an effort to serve the students.

A teacher in an eighth-grade class recalled how she made a personal commitment to call and make contact with all the students in one of her classes per week. She said to me "A lot of numbers that were on file didn't work. A LOT!" She also began to change these calls into mental health checks asking parents, "How is he doing?" or "Is she okay at home?" She said she also found herself offering to liaise a lot between parents and other teachers by trying to use her positive connections to improve the relationships throughout the grade, especially teachers who were uncomfortable with the new requirements. In our interview, she openly admitted that she had not had relationships with the students' families to that level before and that she actually

liked talking to the kids and checking on them. After the pandemic, she changed her role from classroom teacher and took a job as a school counselor at GMS.

In contrast to this approach, the seventh-grade teachers divided the missing students up into homerooms and then individual homeroom teachers tried calling parents. One teacher expressed her frustration at the lack of central organization while trying to reach parents:

So, we took the homeroom classes and made a spreadsheet and had to call

each and every family. So that was super fun when half the numbers don't

work. So it was just a matter of trying to get in contact with the parents

and then keep track…and then communicate with, okay these kids don't

[have technology] and so we're trying to communicate and find out who

has these kids on the master list, and so we're trying to go through and

look and find the students you were looking for…to find out if they had a

device and what their access was. (Teacher B, 30 May 2022)

The annoyance in this teacher's voice was obvious as she tried to articulate the difficulties she had. While students were in school, teachers used to ask individual students for their parents' contact numbers, but there was nobody physically in the building, so the record keeping came under heavy criticism.

One person I interviewed (the special education coordinator) said that his relationships with his students and their families increased and improved during the pandemic. At the beginning of the lockdown, the state governor had specifically said that it was important to make sure students continue receiving special education services they need, "to most closely approximate the therapy and special services they would receive in a normal school day" (Powell -Crain 2022). The special education teacher for eighth grade at GMS took this to heart. When I

111

asked him if his job changed during the COVID lockdown, he smiled and shook his head, "no."

He said he was doing the exact same job of correcting student behavior and helping students with

their work by providing the needed accommodations. He was just doing it over a computer Zoom

meeting. He normally had a higher than average interaction with the students on his caseload and

called and messaged them regularly during normal school, so COVID, he said, "just meant more

of that." He had already built a community and established the correct phone numbers before the

lockdown began. He said a lot of his primary communications during COVID were explaining

policy and services and sending schedules to parents to help them help their students. He is one

of the few members of staff who used his own phone number and did not use a disguising app.

Interestingly, he said he used email to communicate with his students who all had school issued

Chromebooks but sent text messages to communicate with his students' parents who were more

likely to have a phone available than a computer.

Community-Building Function Centered Around Social Media Communities

Another teacher I interviewed, who was very technologically savvy, began noticing

communities developing on social media platforms. She began sharing with her peer group the

posted experiences that teachers in other states were describing.

> I'm active on social media hearing some friends (I call them friends) in
>
> the Facebook groups as they are discussing … they're my West Coast
>
> friends who are teachers who were about two, two to three weeks ahead of
>
> us in the lockdown. So, we were hearing about their issues and
>
> communicating them to administration saying, "Hey, these teachers on the
>
> West Coast (are) dealing with these issues. We might want to be aware of

them" and so that gave us a little bit of a heads up of "we might need to be

a little bit proactive with these things. (Teacher B, 30 May 2022)

She was hoping to learn lessons from the experiences of other school districts around the country

who had locked down their schools before MPS. The removal of geographic restrictions

provided by social media meant that teachers were connecting across the country and forming

new communities that could help each other. The messages included teachers describing how

they were worried about students suffering with their mental health because they were socially

isolated, teachers beginning to provide communication outlets and mental health checks, and

students falling behind academically because of the lack of in-person classroom support.

Community-Building Function Centered Around Parent/School Communities

Everyone in the community was affected by the pandemic, and many parents and teachers felt

that communication from district and government was less than optimum. A couple of teachers

told me that district communications were reactionary and not timely.

The one who was handling communication at that point. He was retiring

and so he was not a stellar communications person, very reactive. So, we

had, there were lots of rumors going back and forth among teachers.

"What have you heard? What have *you* heard?" So, yeah, the rumor mill

was going. (Teacher A, 8 May 2022)

Many appreciated that other districts were having just as many difficulties coping with the new

situation as they were, "they're just normal human beings doing the best they could," said one

sympathetic teacher. With the creation of this void, parents began reaching out to the librarian,

because she was the member of staff contacting them about the distribution of laptops. She

handled their inquiries quietly and discretely. She told me:

They [parents] were asking more about, um, they knew a little something

about the disease, probably as much as we did, but they wanted to know,

are the kids gonna be able to come back to school? How will the kids be

able to get their assignments done? Some of them was, I never used the

computer before. I don't know what to do. My kid don't know what to do,

you know, how can we get some additional help? So, we had things like

that that was coming in constantly in every group that was coming through

(Teacher E, 22 June 2022)

As parents and staff tried to connect, both groups seemed to be looking for the community

connection at a school level. District communication seemed remote to both groups.

The grade level administrator I interviewed lamented the loss of the connections with the

wider community that COVID lockdown generated. He interpreted my questions about

community as the people outside the building combining with the students and teachers. A year

later (when the interviews were conducted) he still feels that the school has not recovered from

shutting the parents out.

As you see, we don't allow parents in the building. When I go down to

meet with a parent, I am reluctant to let them pass the security check, as

far as that goes maybe to the library, or the main office as parent contact.

Certain parents would love to come and shadow their child, but we don't

do that. That used to be one of my main go-to's because it would not

necessarily to inconvenience the parents, just to get help and assistance

with the child and to see them in their school environment. (Principal B,

15 May 2022)

During the lockdown access to the school building was severely restricted, but that restriction

has continued beyond the official closures and schools are still trying to rebuild the community

they lost. The interactions are taking a long time to rebuild, and the consequences of the closures

reach far beyond the official pandemic.

Community-Building Function Centered Around City Communities

The school librarian has always had communications and connections with the local

public library. Before the pandemic, she ran mini-field trips to the local public library. During the

interview she admitted she was really worried about students continuing to read while they were

locked down at home.

> All the librarians, every librarian in the system, we met through zoom, to
>
> try and gather ideas on how we could still engage the kids in reading. How
>
> are we gonna get these kids to continue reading? How are we get some
>
> reading materials in their hands? (Teacher E, 22 June 2022)

Government procedures at the beginning of the pandemic instructed librarians to place all

returned paper products outside in the elements, outside a building, for two days, to kill the virus.

Needless to say, this also "killed" the books. So, the librarian at GMS told me about how she

began reaching out to her contacts and friends from before COVID outbreak.

> Well, I did have a, um, representative from the public library… and they
>
> would do like a story time with the school, with their little babies. They
>
> would do story time for us too. And then they shared materials with us on
>
> how the kids could access their online library…All I had was printed

materials on the shelf. No eBooks in my collection…we're trying to get

some ideas together on how we can reach these kids to continue to have

them engaged in reading. We didn't have any, any eBooks in our

collection. (Teacher E, 22 June 2022)

Currently, the GMS library has a healthy collection of eBooks and the physical books on the

shelves are being used less and less.

Integration of Community-Building Function and Generative Function

In conclusion, the community building function encourages the development of

relationships outside of the aggregates and rings the whole organization into the problem-solving

arena. The story time over zoom meetings was new and innovative and could easily have been

included in the generative function paragraph, but I chose to put it here because as well as being

an outstanding example of innovative thought it also shows the development of wider

community relationships. The community building function combined with the freedom of the

generative function and also allowed the librarian to use her community conversations to see an

opportunity and use her budget to buy eBooks instead of traditional books, benefitting the

students. The community building function also reinforces generative functions as aggregates, in

this case the network of librarians who begin to work together for solutions. This can, in turn,

assist administrative functions with the reinforcement of newly established processes and

development of social norms.

Information-Gathering and Information-Using Functions

Information gathering and information using are different from the other three leadership

functions in that the first three describe how individuals interact and these two relate to what the

interactions are about. The specific use of the word "gathering" implies a collection of

116

information from lots of different and varied sources using different techniques. This was

certainly the case for the teachers at GMS. Several teachers commented that the official channels

of communication used by both the building administration and the district and state

administration were not the most useful. During my interviews I asked each teacher and

administrator how they found out that the school had closed for COVID. GMS was on spring

break at the beginning of the lockdown and so normal channels of intercom announcements and

staff meetings were not available. This gave me an indication of how they were gathering and

collecting information to make sense of a completely new situation.

Throughout the virtual learning teachers continued to gather information from as many

sources as possible. Students, family, social media and real-life friends were at the forefront with

meetings, email, and mass distribution calls coming a far placed second.

I asked the nurse how she found out that the district was closing the schools and she said

the union had told her before the official channels of the district health department. The union,

she said, had tried to advise the school district but she described meetings after lockdown where

the nurses' union met with MPS and MPS "chose whether to take the advice or not." She seemed

tired and unimpressed by people who "just wanted to open the schools back up." Her information

came from several national and local sources, and she explained her role of advising the principal

on public health, but he was not the person making the decisions.

Was GMS at the "Edge of Chaos?"

Complexity leadership theory assumes that the system within which the leadership takes

place is a closed complex adaptive system (CAS) (Albert et al., 2015; Pslek, 1995; Aagaard,

2012; Chiva, 2014, as cited in Turner & Baker, 2019). Complexity leadership events take place at

what is referred to as the edge of chaos (Kauffman, 1995; Mitchellet al., 1993; Stacey, 2002)

where there is a slender boundary between useful complexity and uncontrollable, destructive chaos. This challenges the idea that the only alternative to being in charge is anarchy (Stacey et al., 2000). The suggestion, by Lichtenstein and Plowman (2009), that industrial and commercial leaders may create controversy to artificially build this situation is darkly humorous to educators in public school classrooms, particularly during a global pandemic. The dichotomous construct of certainty and agreement was certainly disrupted during the initial lockdown period. Within this system certainty is measured as stakeholders being either certain or uncertain of the situation, and agreement is measured by the stakeholders being in agreement or far from agreement about the solutions to the problems, with chaos being defined when the system is both uncertain and far from agreement. The pandemic erased the use of classrooms with the state mandated closure of the school buildings for the rest of the academic year; the governor's words left teachers with few concrete physical underpinnings for their instruction, leaving them in the area of far from certainty.

To teachers the local school level seemed to be a world away from the governor's speeches at the capitol. Before the COVID outbreak of March 2020, Ramsey Archibald (2019) wrote an article using data from the US Census Bureau that showed that, on average, a quarter of the population of the state live in homes without internet access. This is in high contrast to the national data, which suggests an average of 82% of households in the country had internet access. Furthermore, this data also showed that 20.7% of households in the states capitol did not have internet, an even greater disparity than the national norm. As one teacher said to me:

> Our initial thought, I think as a teacher, was how are these children going
>
> to learn? If they are going to learn through devices do they have devices?
>
> If they don't have devices, is it our responsibility, as their school, to

provide them with devices? How are we going to do that? (Teacher A, 8

May 2022)

With teachers being given complete individual responsibility for their lessons but not

having training in virtual instruction and with some not being tech-minded, or having received

little to no explicit training, they were left far from agreement. One teacher, who has a master's

degree in instructional technology from a local university expressed her frustration at the lack of

consistency in the learning environments:

> There are teachers who are very tech-savvy who could go forward and
>
> make great lessons, and there were teachers who couldn't even load up the
>
> sheets on Edgenuity and needed help, and so it wasn't just the kids having
>
> equitable access but the training among the teachers …it was very (sighs)
>
> you know how it is. … The old teachers who understand how to design
>
> learning and those who struggle with technology… it wouldn't be fair to
>
> students if they were in Miss Smith's class who can't use technology and
>
> their friend is in my class and I can design the lessons. (Teacher B, 30
>
> May 2022)

Consequently, after the governor's and the state superintendent's press conferences announcing

the closing of physical school buildings and the introduction of "enhanced virtual schooling,"

GMS could be said to be at the edge of chaos. Stakeholders were both far from certainty and far

from agreement, and therefore in the correct climate for complex leadership events to take place.

Were Aggregates and Meta-Aggregates Formed Within the CAS?

A complex adaptive system (CAS) is made up of individuals who are totally independent

of each other but form social groups and networks called aggregates; these groups can produce

emergent leadership events and influence change and movement in the whole system. These social groupings are formed around shared history and experiences. These aggregates, created by individuals who during this period were operating at the edge of chaos, and no longer even shared a permanent work place with each other, fulfilling the non-linear and non-reductionist properties that help to define a complex adaptive system (Turner & Baker, 2019), producing adaptive and self-organizing paths and leadership events. They began with imposed work groups and developed into friendship aggregates that still centered around the tag of GMS, but with more interpersonal undertones.

These bonding processes do not necessarily happen during the chaotic period of the system. They are equally valid if they have been formed previously in calmer times. In the academic year before the pandemic (2018/2019), the principal of the school had performed a series of climate analyses in preparation for his PhD dissertation: "Evaluating Critical Initiatives Related To Climate At A High-Poverty Middle School." His written analysis provides an insight into a school that was having difficulties:

> Throughout the fall semester, five teachers resigned due to their inability
> to address students' needs. Although each teacher who resigned was
> certified, they lacked one or more critical skills needed to be most
> effective with our challenging student population. During the 2018–2019
> school term, the school's climate among students, staff, and faculty
> suffered tremendously. (Principal A - dissertation)

The principal was, ironically, trying to implement team climate improving initiatives immediately prior to the governor's closure statements, but as lockdown was implemented, any previous improvement plans were shelved.

Complex adaptive systems consist of individuals who have found social commonality in tags and attractors that have facilitated the formation of social groups and networks called aggregates. Tags are the conversational topics that provide the initial starting point for the group to come together; they can be based on personal relationships, work-oriented connections, or a mixture of both simultaneously. The aggregates align (correlation), informally form themselves into a more cohesive structure (aggregation), and then reinforce themselves in an echo chamber environment (autocatalysis) (Brown, 2011). As this process matures stability and reassurance develop and leadership events emerge. Ultimately, traditional leaders provide the structures to facilitate the events and give meaning to what is happening (Plowman et al, 2007b). Professionally, teachers at GMS had two work-oriented pre-formed groupings; they were both a subject teacher (English, math, science and humanities) and a grade level member (6th, 7th and 8th grade). These groupings generated two preformed - work initiated - aggregates. Staff turnover is huge at GMS with seven out of eight core teachers leaving eighth grade to go to other schools or retire after the 2021-2022 school year. Retaining staff was always a major difficulty well before 2020; high staff turnover has immensely detrimental effects on relationships and ultimately the formation of aggregates. One faculty member, a veteran teacher who was in her first year teaching at GMS, said when the school locked down the only person she really communicated with was the subject curriculum specialist. She had a sadness in her voice when she said:

> There's been such a change in school leadership and high turnover, that
>
> you don't warm up to people. (Teacher B, 30 May 2022)

Teaching is based on relationships both between teacher and students and between the teachers themselves. The uncertainty of these relationships year on year undermines a foundational part of that friendship process as the teacher continued:

> It's hard to form those bonds when you're not sure they're going to be there
>
> next year. (Teacher B, 30 May 2022)

The school climate in the academic year prior to the pandemic lockdown and the high staff turnover also had severe implications on the staff relationships with each other and administration. The organization of the classes was also cited as being one of the underlying reasons for reduced staff interactions, the teacher continued:

> Because we weren't in teams, I didn't have phone numbers for anyone but
>
> [the principal]. We might have had a couple of friends on Facebook but for
>
> the most part we just didn't talk to each other … we could email if we had
>
> a question but there was really no communication, at least from my
>
> perspective. It was my first year at the school so I didn't have the bonds
>
> that we have now, I didn't have anyone that I could freely text snarky
>
> comments to. There were so many issues that year. Even before COVID,
>
> there were a lot of issues. (Teacher B, 30 May 2022)

The implication is that the teachers wanted to have relationships with each other. They wanted to exchange "snarky comments" along with the dark humor that makes some difficult work situations more bearable. These comments are not necessarily related to toxic behavior but more in line with bonding over the common tag that work, as a middle school teacher, during a pandemic, was difficult and demanding. The teacher here considered this more venting than unhealthy and unproductive and the comments, made between friends, made the work

122

environment more bearable. The formal channels of communication were open in that teachers could "email if they had a question," but that implies a premeditated thought process that is generally missing from a spontaneous friendship-based conversation. The high stress environment of teaching in an overcrowded school and organization of the students was a prohibitive factor in making aggregate connections, even before the isolation of the pandemic.

There are inevitably some teachers who had worked together for extended periods and the camaraderie was perhaps stronger between these individuals, maybe because of the extraneous circumstances. They have survived the turnovers together. Several interviewees mentioned a specific pair friend group that they knew of, but they talked about them in the exception not the rule. "But they've been partnered together for like four or five years." In the context of other schools this is not a huge amount of time where teachers can be in the same establishment for their whole careers, but for GMS this is exceptional.

At the beginning of the lockdown meta-aggregates formed loosely around formal school structured groupings such as grade level teachers and subject teachers, rather than the organic collaboration of aggregate friendship groups finding their own commonality. Grade level teachers resolved problems like discipline and procedures. The following quote from one of the few veteran teachers at GMS shows a commonality of student welfare and learning but avoids any personal interactions. She talks about how they talked to each other at the beginning of the lockdown period as everyone struggled to find some kind of security and reassurance.

> I think we all have the same goal in mind - what can we do to help these
>
> children? But how are we going to get this job done? I'm not sure what
>
> I'm doing, do you know what you're doing? What do you think you're
>
> going to do? Okay, this is what I think I'm going to do. Okay, let's see

how that works, okay? When I say that out loud does that make sense to you ? I need you to be my sounding board because I'm not really sure so I think it helps, because we were all talking to one another, trying to figure it out, we realize that's not going to work, that it would work better if we put this together with that and left that right out. (Teacher A, 8 May 2022)

The correlation and aggregation for this meta-aggregate were externally provided through professional requirements and externally dictated grouping, but there is no element of natural autocatalysis here (Brown, 2011). In chemistry autocatalysis happens when a product from the reaction is the catalyst and the reaction continues to progress quickly producing its own impetus. Within this research this is demonstrated through sharing lesson planning and reinforcing teaching ideas, and the reassurance and reinforcing from the other members of the aggregate in return, the success, and positive reinforcement from peers, is a catalyst for more ideas. And then as the lockdown progressed teachers began to talk about how these work-enforced groups began to change into friendships through work related communication. When asked if there were relationships before the lockdown one teachers said:

I knew who they were, and I talked to them but I don't think I talked as much as I did when I wasn't in the building because when something came up I could just stick my head in the hallway and say like, "Hey, Miss Parker, when you get a second, come here." I can't do that because I'm at my house, and you're at your house, so I'm constantly emailing, and we all had each other's cell number, so we're in a group chat together so we definitely talked more and got closer during the pandemic. Yes, I would definitely say that. (Teacher A, 8 May 2022)

124

The chaos and insecurity of the situation allowed bonds to form both through necessity and through the human need to find understanding and relationship. Teachers using natural teleology within their aggregate structure and trying to fulfill their personal and professional requirements becomes evident.

Conclusions

GMS was operating at the edge of chaos during the COVID pandemic lockdown of 2020, aggregates and meta-aggregates were formed, and a Complex Adaptive System was formed. The complex leadership theory framework can be applied to this organization during this time.

Having had their decision-making ability effectively removed; the building administration changed the way decisions were made by employing the complex leadership theory administrative function by using entrainment to enable emergence of leadership events. An example of this was the administration providing timetables and schedules for the teachers to work within and adapt.

Simultaneously to administration providing coarse grain structures, teachers were operating within the generative function to adapt fine grain procedures to better address the immediate needs of their students. These actions lead to leadership events to emerge from the aggregates and change the administratively imposed coarse grain procedures.

The community building function of complex leadership reinforces and strengthens the place of the CAS communities within the external communities. Coarse grain processes arise through the interactions of overlapping community groups and social expectations. The different interacting communities identified include the groups in the building and those outside the building which intimately interacted.

Chapter 5: Conclusion

Complex leadership takes place at the edge of chaos when the environment is far from

certainty and far from agreement (Kauffman, 1995; Mitchell et al., 1993; Stacey 2002), in

summary, "far-from equilibrium" (Meyer et al., 2005, p. 1; Prigogine, 1995). Aggregates, which

may have formed previous to the current situation, come together to change fine grain

procedures in everyday operations through the Generative leadership function. Administration

and traditional leadership positions use these changes at "grass roots level" to change coarse

grain procedures that enable the organization to adapt and survive. Having established that GMS

was operating under edge of chaos conditions during the pandemic lockdown of 2020 this

126

research showed that emergent leadership events changed fine grain procedures which in turn changed coarse grain policies. Participant interviewees described small, but significant, changes that were made to the everyday operation of the classrooms through informal collaboration that were adopted as permanent changes by administration.

Summary of the Study

This study explores the experiences of administration, faculty and staff at a Title I middle school in a south eastern state of the United States of America using a framework of complex leadership theory. This study's findings support the existing literature and research but also add to it by including thick description and tangible to each of the leadership functions. The specific examples of each of the functions, with detailed descriptions of each, provide understanding as to how the theoretical framework is implemented. The administration in my study were not specifically implementing complex leadership theory, however, an examination of their actions and behaviors shows that this framework is very applicable and useful for this analysis.

Significance of the Study

Study findings show that a Title I middle school in a mid-sized city in the Southeastern United States, along with every other domestic school, underwent monumental changes during the CoVID-19 pandemic. The fundamental changes to education imposed by federal and state level mandates left individual buildings at the edge of chaos where the administration, faculty and students were far from certainty and far from agreement. A framework for complex leadership was constructed and applied to the complex adaptive system to show the formation of aggregates and the changes in coarse grain structures, to the fine grain procedures developed by

those aggregates. Study findings support the existing literature and research but also add to it adding thick description and tangible examples to each of the leadership functions.

Research Question

The study explored the following research question: *How did the decision-making processes of traditional leadership roles change through the interaction of the four functions of complex leadership theory in a Title I middle school in response to the COVID -19 crisis?*

Review of Methodology

This is an instrumental, single case study design, which is the use of a case study to understand something else (Stake, 1995). The *case* is a community who are centered around a public middle school and bounded spatially and temporarily. The *study* sought to develop an understanding of the complex leadership within this community during the COVID -19 lockdown at the beginning of 2020. A qualitative inquiry methodology was selected for this study as a means of prioritizing the perspectives and lived experiences of the study participants (Creswell & Poth, 2016), using semi structured, ethnographic interviews. These interviews were then analyzed for emergent themes.

Some interviewees gave permissions for their interview to be recorded and these interactions were transcribed and then analyzed. Several interviewees were not comfortable with recorded interviews and these interactions were recorded by hand during the interview and then follow up notes were made immediately afterwards. Codes taken from the analysis of the interviews formed categories that grouped codes together. Complex leadership theory provided a framework for the analysis of the interviews, with themes being taken directly from the theoretical work.

Major Findings

Operating at the Edge of Chaos

My research and interviews show that GMS was operating at the edge of chaos caused by the COVID -19 pandemic. The administrators, faculty and staff were both far from agreement in the way that the education would be provided in the new environment and far from certainty as to how the situation would be resolved. This environment produced the formation of aggregates.

Findings Related to Literature

The current literature divides complex leadership theory into five components that together work to promote emergent leadership events from aggregates formed from within the Complex Adaptive System (CAS). This research provides tangible descriptions of these leadership functions within a real-life situation. The research takes the theoretical descriptions of the administrative (Uhl-Bien et al., 2007; Hazy & Uhl-bien, 2015), generative (Hazy, 2011; Hazy & Uhl-Bien 2015; Surie & Hazy 2006), community building (Hazy, 2011; Hazy & Uhl-Bien, 2015), information-gathering (Hazy & Uhl-Bien, 2015) and information-using functions (Hazy & Uhl-Bien, 2015) and shows them in operation.

The next section will compare the findings of this study in parallel with Appendix B (first presented in Chapter 2), A Summary of Leadership Functions and their Mechanisms, which describes each of the leadership functions as presented in the literature.

Generative

To allow teachers to develop solutions to immediate problems they must be encouraged and allowed the freedom to form aggregates with other involved parties. They have to be allowed independence of thought. Hazy and Uhl-Bien (2015) describe this as an entrepreneurial process in which enabling (Hazy & Uhl-Bien, 2015) and adaptive (Uhl-bien et al., 2007) conditions provide room for experimentation. This research showed this function in practice as teachers

were allowed the flexibility to develop lesson schedules that fitted the needs of their students. The teacher developed fine grain adjustments were adopted into coarse grain policy by the building administration. It shows that administration encouraged the broad adoption of innovations that have been vetted (Garud et al., 2006, 2011, as cited in Hazy & Uhl-Bien, 2015) and intentionally did not punish failure (Backstöm et al., 2011, as cited in Hazy & Uhl-Bien, 2015). The new schedules were a practical combination of the original, produced by the administration, and the changes requested by the teachers to accommodate students who were having technology issues. This research shows "the paradox of control" in practice as teaching groups were given controlling features that could not be intricately managed (Uhl-Bien & Marion, 2009). In conclusion, this research shows the generative leadership function positively correlated to the success of the emergence mechanism to produce new coarse-grain procedures (Hazy & Uhl-Bien, 2015).

Administrative

The administrative function provides rules and restrictions though a process of entrainment (Brown, 2011; Hazy & Uhl-Bien, 2015). This provides teachers with the security of being able to know they are doing the job required of them. There are inevitably "big picture" issues that classroom teachers are unaware of, that administration need to address through daily regulations. This leaves the administrative function convergent (Hazy, 2011) with defined chains of responsibility (Hazy & Uhl-Bien, 2015), role clarity (Baltaci & Balci, 2017), and consistent routines (Baltaci & Balci, 2017). This research shows this function in practice through the administrative control of the paper packets that were distributed to students who did not have the

required access to either a computer, the internet or both. Teachers wanted to provide detailed

paper packets from each class, but administration knew this was logistically impossible for

distribution and collection. The principal showed that the larger issues were not with the teachers

assigning work but with the logistical chain that the teachers didn't know about, he said:

> Unfortunately, it's too complicated. And we have limited staff. They
>
> [district administration] took all of our security guards except one…So
>
> that one person had to sit, sit at the door all day and take packets and give
>
> out packets and all that. And I just didn't have the personnel to sit through
>
> all of that complicated mess. (Principal A, 2 August 2022)

This research shows the administrative leadership function in conflict with the informal nature of

the CAS, showing the difficulties faced by a principal trying to maintain bureaucratic control

while at the edge of chaos; this dichotomy is called entanglement (Schneider & Somers 2006).

Entanglement describes the relationship between the formal top-down structures found in

traditional organizations and the resonant aggregates formed through complex social interactions.

The administrative leadership function worked in coordination with generative functions to

prevent over authoritarian control mechanisms destroying the emerging complexity (Baltacı &

Balcı, 2017).

Community Building

In times of chaos communities can help each other through support and shared

experiences. The community building function (Hazy, 2011; Hazy and Uhl-Bien 2013) enables

communities (Uhl-Bien et al. 2007) to find solutions together through intrinsic motivation

(Uhl-Bien et al., 2007). It identifies "in-groups" (Northhouse, 2015) that together can develop

solutions to the problems created by the situation and outdated, unrealistic coarse grain

procedures. It encourages citizenship behavior (Hazy & Uhl-Bien, 2015). This research identified several different communities within the school. Each individual classroom, be it real or virtual can be considered as a community of students. There is a simultaneous community of the school, students and teachers and the immediately connected parents. The wider community of schools within the district branches out into the larger community of the city including churches and grass roots community groups. The community building leadership function applies to all of these groups, encouraging participation across the groups and ultimately producing emergent leadership events. Community building was sown in this research in the new, non-traditional channels of communication that were developed, for example teachers and parents communicating through messaging and facetime. Students developed their new virtual community by advocating for each other and letting teachers know when they could come to virtual lessons because of outside problems. The research also highlights the role that the school played in the wider community by providing epidemiological advice to parents who did not have access to information about the pandemic or the disease.

Information Gathering and Information Using

This study did not address these functions of the complex leadership theory.

Implications for Practice

Complex Leadership, Like Teaching, Is Built on Relationships

The generative function of the complex leadership theory, presented in this research, is fundamentally based in the successful formation of meaningful relationships. Relationships between teachers, facilitate the formation of aggregates that ultimately result in emergent leadership events that change fine grain procedure to solve problems. Traditional leadership positions can promote this process by encouraging the formation of aggregates and

meta-aggregates by facilitating communication. These groupings ultimately form new, and sometimes revolutionary, solution-based procedures through the processes of autocatalysis and resonance.

Simultaneously, relationships and the resultant trusted communication between students and teachers can highlight the problems with the processes that are in place, that are being encountered, and that may not be immediately obvious to others outside the communities. These communication pathways feed the Information-Gathering function providing original perspectives and new data. Information using within the aggregate structure then facilitates new methods that are more effective, and solutions are proposed and tried.

Leaders Must Acknowledge and Encourage Relationships

Complex leadership, like teaching, is built on relationships. The generative function of the complex leadership theory, presented in this research, is fundamentally based in the successful formation of meaningful relationships which facilitate the formation of aggregates that ultimately result in emergent leadership events that change fine grain procedure to solve problems. Traditional leadership positions can promote this process by encouraging the formation of aggregates and meta-aggregates by facilitating communication. These groupings ultimately form new, and sometimes revolutionary, solution-based procedures through the processes of autocatalysis and resonance.

Good classroom relationships have been historically acknowledged as the foundation of successful classroom management and engaged learning, however, these relationships also feed into the community building function of complex leadership theory which encourages a sense of belonging. Conversations with students can lead to aggregates forming suggested solutions, as in the case of students in this research telling the teachers about peer access to technology.

133

The trust relationship between administration, faculty and students which allows this process to happen is therefore imperative. Teams of teachers cannot simply be told to communicate with each other, relationships must be developed around tags and common interests that are not necessarily work related. At the lowest level of encouragement administration should provide a phone tree so teachers can communicate with each other. Social gatherings outside of work should be encouraged particularly gatherings that reinforce outside interests that will develop aggregates. The classic staff Christmas or holiday party, or faculty tailgating before an significant school sports event could be important in forming relationships outside the work environment; to such an extent that planning time and monetary resources should be allocated. Conversations about things other than work, in the right context of the school day, can strengthen the relationships that form aggregate groups that can develop fine grain operating procedures during times of uncertainty. If possible, a faculty room with comfortable chairs and a quiet work area should be provided to encourage staff to talk to each other in a student free environment.

Relationships between faculty may not be prevalent in normal times but during times of stress teachers will form aggregates and meta-aggregates to problem solve and radically reassess fine grain procedures to provide appropriate solutions. These aggregates of teachers can develop powerful and innovative solutions to previously unknown problems.

Teachers should be allowed to have time with students that is not solely academic to develop trust relationships that will survive chaotic environments. Homerooms and academic advisory times allow for appropriate social conversations that develop connections between students and teachers. Teachers and students watching school sporting events together promotes school spirit and social interactions with school orientated conversations. Sports coaching and

clubs and activities like chess club and dungeons and dragons club, outside the classroom, also allows for a development of more personal connections that become important in times of chaos.

Leaders Must Strike a Balance Between Generative and Administrative Functions

Leaders using complexity leadership theory as their guide need to strike a fine balance between allowing aggregate groups to have a free reign to form localized solutions to problems and the best interests and needs of the larger establishment. There are many complex logistical relationships happening in a large organization that individuals and small groups are probably unaware of. Leaders provide an overview and a tangible link between all the different aspects of the organization. The generative function must be controlled with the administrative function to avoid well-intentioned anarchy where individual aggregates become detached from the larger operation. The ability to generate new and innovative ideas and processes at the fine grain level must also include the possibility of failure which should not be seen as a definitively bad outcome. Groups and aggregates who are afraid of failure are unlikely to use their full potential to develop alternative procedures that meet their needs. Administration must be aware of the risks of ideas that do not fit smoothly into the larger organization or that don't give the desired results. They must also communicate why a fine grain procedure change does not fit into the larger organization in order to show aggregates that their effort is appreciated but that the implementation is not possible. This level of trust and communication will reinforce the relationships.

Aggregate implemented fine grain procedural adjustments that are successful require administrative support and the implementation of the ratcheting process to secure the changes in place. Changes in coarse grain procedures influenced by the alterations to fine grain strategies

should be put in place by new rules and the appropriate communication of the change. Stakeholdership is a powerful and well-established motivator for small groups and aggregates.

Recommendations for Future Research

The administration in my study were not intentionally implementing complex leadership theory. The principal had heard of, and studied the theory, as he has a PhD in educational leadership, however, he did not purposely use its tenets. The observations recorded are of a faculty and staff operating at the edge of chaos doing what they think is best under the extreme circumstances. My observations of their actions uses the lens of complex leadership theory to provide a framework for analysis. The aggregates were not artificially encouraged by administration, but formed naturally through teleology, the deliberate pursuit of a desired end, (Marion & Uhl-Bien, 2001). The relational dynamics of leadership in both conventional and complex processes has been severely overlooked in contemporary leadership research (Uhl-Bien, 2006). Further research should be conducted in an environment that has purposely and intentionally adopted a complex leadership theory approach to problem-solving in chaotic environments. Purposely encouraging the emergent leadership events through the generative and administrative processes should be observed in comparison to this research.

This is just one Title I middle school in one south eastern state. This case study employed a qualitative inquiry methodology, prioritizing the perspectives and lived experiences of the study participants (Creswell & Poth, 2018), more research showing relationships and emergent leadership events in other educational chaotic environments should be examined. Chaotic environments, that are far from understanding and far from agreement, occur with alarming regularity within education. The introduction of a new curriculum or a large staff turnover may produce circumstances where staff are unsure of how to implement change effectively. Equally

the tragic death of a student or faculty member may put the school environment into a situation at the edge of chaos where complex leadership theory is applied. The lens of complex leadership can be applied both to environments employing intentional application of the theory and as a tool for understanding an environment that has never heard of it.

This research is conducted by an outsider observing the formation of aggregates and the subsequent emergent leadership events, one year after the event. Investigations should also be conducted by researchers embedded within an aggregate to show its formation from an inside point of view. This would detail how the emergent leadership event developed, including failed proposals that were eliminated by natural selection before anyone outside of the group heard about them. These failures are rarely communicated after the fact as they are considered irrelevant considering a successful proposal. This research would also include how the aggregate members reacted to the use of the administrative function without the detailed external understanding of the larger organization.

Concluding Remarks

GMS was operating at the edge of chaos during the COVID - 19 pandemic lockdown of 2020, aggregates and meta-aggregates were formed, and a Complex Adaptive System was formed. The complex leadership theory framework can be applied to this organization during this time.

Having had their decision-making ability effectively removed; the building administration changed the way decisions were made by employing the complex leadership theory administrative function by using entrainment to enable emergence of leadership events.

An example of this was the administration providing timetables and schedules for the teachers to work within and adapt.

Simultaneously, to administration providing coarse grain structures, teachers were operating within the generative function to adapt fine grain procedures to better address the immediate needs of their students. These actions lead to leadership events to emerge from the aggregates and change the administratively imposed coarse grain procedures.

References

Aagaard,P. (2012). The challenge of adaptive capability in public organizations: A Case Study Of Complexity In Crime prevention. Public Manag. Rev, 14, 731–746

Albert, D.; Kreutzer, M.; Lechner, C. (2015) Resolving the paradox of interdependency and strategic renewal in activity systems. Acad. Manag. Rev, 40, 210–234

Altman, S. A., (2020). "Will COVID-19 Have a Lasting Impact on Globalization"?. Harvard Business News, 20 May.

Archibald, R., (2019, Dec. 27, 07:30) "Rural disconnect: Majority in some [State] counties don't have internet access". Local Newspaper.

Backström, T., Wilhelmson, L., Olsson, B.K., et al. (2011). The role of manager in the post-industrial work system. In: Seglod E, Berglund E, Bjurström E, et al. (eds) Studies in Industrial Renewal. Va¨stera˚s: Ma¨lardalen University Press, pp. 215–227. Baker E, Onyx J and Edwards M (2011) Emergence, social capital and entrepreneurship: Understanding networks from the inside. Emergence Complexity and Organization 13(30): 21–38.

Bak, P., & Paczuski, M. (1995). Complexity, contingency, and criticality. Proceedings of the National Academy of Sciences, 92(15), 6689-6696.

Baker, P. (2020 March 11) U.S. to Suspend Most Travel From Europe as World Scrambles to Fight Pandemic. New York Times. Retrieved from:

https://www.nytimes.com/2020/03/11/us/politics/anthony-fauci-coronavirus.html

Baltacı, A. & Balcı, A. (2017). Complexity Leadership: A Theoretical Perspective. International Journal of Educational Leadership and Management, 5(1), 30-59. doi: 10.17583/ijelm.2017.2435. Retrieved from: http://dx.doi.org/10.17583/ijelm.2017.2435

Bartlett, L., & Vavrus, F. (2016). Rethinking case study research: A comparative approach. Taylor & Francis.

Battram, A. (1998). "Navigating Complexity". London: The Industrial Society.

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. The qualitative report, 13(4), 544-559.

Brown, A., & Danaher, P. A. (2019). CHE principles: Facilitating authentic and dialogical semi-structured interviews in educational research. International Journal of Research & Method in Education, 42(1), 76-90.

Brown B. C., (2011). "Complexity Leadership: An overview and Key Limitations". Integral Leadership Review, Learner Papers, October. Retrieved from:

http://integralleadershipreview.com/3962-learner-paper-complexity-leadership/

Christie, P.,& Lingard, B., (2001). "Capturing complexity in Educational Leadership". American Educational Research Association Conference, Seattle.

Cilliers, P., & Spurrett, D. (1999). "Complexity and postmodernism: Understanding complex systems". South African Journal of Philosophy, 18(2), 258-274.

Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory into practice*, *39*(3), 124-130.

Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.

Crowther, F., Kaagan, S. S., Ferguson, M. and Hann, L. 2002. *Developing Teacher Leaders: How Teacher Leadership Enhances School Success*, Thousand Oaks, CA: Corwin Press.

Daniel, S.J. Education and the COVID-19 pandemic. *Prospects* 49, 91–96 (2020). https://doi.org/10.1007/s11125-020-09464-3

Darling‑Hammond, L., (2007) Race, inequality and educational accountability: the irony of 'No Child Left Behind', Race Ethnicity and Education, 10:3, 245-260, DOI: 10.1080/13613320701503207

Darling-Hammond, L., & Kini, T. (2020). A New "New Deal" for Education: Top 10 Policy Moves for States in the COVID 2.0 Era. Learning policy Institute. Retrieved from:

https://learningpolicyinstitute.org/blog/COVID-new-deal-education-top-10-state-policy-mo
ves

d'Orville, H. COVID-19 causes unprecedented educational disruption: Is there a road towards a
new normal? *Prospects* 49, 11–15 (2020). https://doi.org/10.1007/s11125-020-09475-0

Evers J. C., & Van Staa A.,(2020) "Validity". Encyclopedia of Case Study Research. SAGE
Publications, Inc. Thousand Oaks p774-757:

Fisch K., (2006) "Did you know?"{blog post} retrieved from the
http://thefischbowl.blogspot.com/2006/08/did-you-know.html

Fiscus, K (2020, June 30, 12.10) "[State] & coronav.irus timeline: How COVID-19 spread and
how the state reacted" Local newspaper

Francois, C., & Weiner, J. (2022). Internal, Moral, and Market Accountability: Leading Urban
Schools During the COVID-19 Pandemic. *Urban Education*, 00420859221097019.
https://doi.org/10.1177/00420859221097019

Garud, R., Kumaraswamy, A., & Sambamurthy, V. (2006). Emergent by design: Performance
and transformation at Infosys Technologies. *Organization Science*, *17*(2), 277-286.

Gelfand, M & Raver, J & Nishii, L & Leslie, L & Lun, J & Lim, B & Duan, L & Almaliach, A &
Ang, S & Arnadottir, J & Aycan, Z & Boehnke, K & Boski, P & Cabecinhas, R & Chan, D
& Chhokar, J & D'Amato, A & Ferrer, M & Fischlmayr, I & Yamaguchi, S. (2011).
Differences Between Tight and Loose Cultures: A 33-Nation Study. Science (New York,
N.Y.). 332. 1100-4. 10.1126/science.1197754.

Gell-Mann M (2002) What is complexity? In: Curzio AQ and Fortis M (eds) Complexity and
Industrial Clusters: Dynamics and Models in Theory and Practice. Berlin: Physica-Verlag,
pp. 13–24.

Ghebreyesus, T., A. [@ DrTedros]. (2020, February 11) "We now have a name for the #2019nCoV disease: COVID-19. I'll spell it: C-O-V-I-D hyphen one nine – COVID-19" Retrieved from:- https://twitter.com/WHO/status/1227248333871173632

Gilani, P., Bolat, E., & Wilkin, C. (2018). Leadership chaos: when power is in the hands of followers.

Goldstein J, Hazy JK and Lichtenstein B (2010) Complexity and the Nexus of Leadership: leveraging Nonlinear Science to Create Ecologies of Innovation. Englewood Cliffs, NJ: Palgrave Macmillan.

Harris, A. (2020), "COVID-19 – school leadership in crisis?", *Journal of Professional Capital and Community*, Vol. 5 No. 3/4, pp. 321-326. https://doi.org/10.1108/JPCC-06-2020-0045

Harris, A., & Jones, M. (2020). COVID 19–school leadership in disruptive times. *School Leadership & Management*, *40*(4), 243-247.

Hatch, M.J. and Cunliffe, A.L. (2006). Organization Theory: Modern, Symbolic, and Postmodern Perspectives, ISBN 9780199260218.

Hazy, J. K., & Uhl-Bien, M. (2015). Towards operationalizing complexity leadership: How generative, administrative and community-building leadership practices enact organizational outcomes. Leadership, 11(1), 79-104.

Hazy JK (2012) The unifying function of leadership: Shaping identity, ethics, and the rules of interactions. International Journal of Society Systems Science 4(3): 222–241.

Hazy JK (2011) Parsing the influential increment in the language of complexity: Uncovering the systemic mechanisms of leadership influence. International Journal of Complexity in Leadership and Management 1(2): 164–192.

Hazy, J. K., & Ashley, A. (2011). Unfolding the future: Bifurcation in organizing form and

emergence in social systems. Emergence: Complexity & Organization, 13(3), 57-79.

Herold, B. (2020). The disparities in remote learning under coronavirus (in charts). *Education

Week, 10.*

Hill, L, and Artiga, S, (2022, Aug 22) "COVID-19 Cases and Deaths by Race/Ethnicity: Current

Data and Changes Over Time". KFF.org

Houglum, D. T. (2012). Myth-Busters: Traditional And Emergent Leadership. Emergence:

complexity & organization, 14(2).

Insiderintelligence.com "Generation z Facts", (n.d.) retrieved from:

https://www.insiderintelligence.com/insights/generation-z-facts/#:~:text=What%20are%20t

he%20common%20Generation,older%20generations%20do%20watching%20television.

Jennings, P.L. and Dooley, K.J. (2007). "An emerging complexity paradigm in leadership

research," in J.K. Hazy, J.A. Goldstein and B.B. Lichtenstein (eds.), Complex Systems

Leadership Theory: New Perspectives from Complexity Science on Social and

Organizational Effectiveness, ISBN 9780979168864, pp. 17-34.

Kanno, Y., & Kangas, S. E. (2014). "I'm not going to be, like, for the AP" English language

learners' limited access to advanced college-preparatory courses in high school. American

Educational Research Journal, 51(5), 848-878.

Kauffman, S. A., (1995). "At home in the universe: the search for the laws of self-organization

and complexity", Oxford University Press, New York.

Kershner, B., & McQuillan, P. J. (2016). "Complex adaptive schools: Educational leadership and

school change". Complicity: An International Journal of Complexity and Education, 13(1).

Lambert, L. (1998). *Building leadership capacity in schools*. ASCD.

Leech, B. L. (2002). Asking questions: Techniques for semistructured interviews. PS: Political
science and politics, 35(4), 665-668.

Leithwood, K., & Jantzi, D. (2000). "The effects of transformational leadership on organizational
conditions and student engagement with school". Journal of Educational Administration,
38(2), 112–129.

Leithwood, K., & Jantzi, D. (1999). "Transformational school leadership effects". School
Effectiveness and School Improvement", 10(4), 451–479.

Leithwood, K., & Jantzi, D. (1990). "Transformational leadership: How principals can help
reform school cultures. School Effectiveness and School Improvement", 1(4), 249–280.

Levinson, M., & Markovits, D. (2022). The biggest disruption in the history of American
education. *The Atlantic*.

Lichtenstein B and Plowman DA (2009) The leadership of emergence: A complex systems
leadership theory of emergence at successive organizational levels. The Leadership
Quarterly 20: 651–661.

Lichtenstein, B., Uhl-Bien, M., Marion, R., Seers, A., Orton, J. D., & Schreiber, C. (2006).
Complexity leadership theory: An interactive process on leading in complex adaptive
systems. Emergence: Complexity and Organization 8(4): 2–12.

Lyu, D., Tian, Y., & Zhao, Y. (2020, January 20) China Will Rack Up Three Billion Trips During
World's Biggest Human Migration. Bloomberg News. Retrieved from:
https://www.bloomberg.com/news/articles/2020-01-20/china-readies-for-world-s-biggest-h
uman-migration-quicktake

Manson, M., (2001). Simplifying complexity: a review of complexity theory. Geoforum 32(3):
405-414.

Marion R., and Uhl-Bien M. (2001) Leadership in complex organizations. The Leadership
Quarterly 12: 389–418.

Marshall, D. T., Pressley, T., & Love, S. M. (2022). The times they are a-changin': Teaching and
learning beyond COVID-19. *Journal of Educational Change*, 1-9.

Marshall, D. T., Shannon, D. M., & Love, S. M. (2020). How teachers experienced the
COVID-19 transition to remote instruction. *Phi Delta Kappan*, *102*(3), 46-50.

Merrill, S. (2020, March 19). Teaching through a pandemic: A mindset for this moment.
Edutopia.

Merriam, S. B. (2009). Qualitative research: A guide to design and implementation. San
Francisco, CA: Jossey-Bass.

Meyer, A. D., Gaba, V., & Colwell, K. A. (2005). Organizing far from equilibrium: Nonlinear
change in organizational fields. Organization Science, 16(5), 456-473. Microsoft.com
(2020). Retrieved from:

https://www.microsoft.com/en-us/corporate-responsibility/empowering-employees

Miles, M. B., & Huberman, A. M., (1994). "Qualitative data analysis: An expanded source
book" (2nd ed.) Thousand Oaks, CA: Sage.

Mitchell, M., Hraber, P., & Crutchfield, J. P. (1993). "Revisiting the edge of chaos: Evolving
cellular automata to perform computations". arXiv preprint adap-org/9303003.

Morrison, K. (2012). "School Leadership and Complexity Theory". New York: Routledge.

Morrison, K., (2010)." Complexity Theory, School Leadership and Management: Questions for
Theory and Practice". Educational Management Administration & Leadership 38(3)
374–393. DOI: 10.1177/1741143209359711

Morrison, K. (2006, November). "Complexity Theory and Education". In APERA Conference, Hong Kong (pp. 28-30).

Neustadt,R.E., & May,E.R.(1986).Thinking in time. NewYork: Free Press.

Northouse, P. G. (2015). "Leadership: Theory and Practice". New York: Sage.

Netolicky, D.M. (2020), "School leadership during a pandemic: navigating tensions", *Journal of Professional Capital and Community*, Vol. 5 No. 3/4, pp. 391-395. https://doi.org/10.1108/JPCC-05-2020-0017

Ortegón-Monroy, Maria. (2003). Chaos and Complexity Theory in Management: An Exploration from a Critical Systems Thinking Perspective. Systems Research and Behavioral Science. 20. 387 - 400. 10.1002/sres.566.

Plowman D, Baker LT, Beck T, et al. (2007a) "Radical change accidentally: The emergence and amplification of small change". Academy of Management Journal 50(3): 515–543. 102 Leadership 11(1).

Plowman D, Baker LT, Beck T, et al. (2007b) "The role of leadership in emergent, self-organization". The Leadership Quarterly 18(4): 341–356.

Plowman, D. A., & Duchon, D. (2008). "Dispelling the myths about leadership: From cybernetics to emergence". Complexity leadership part, 1, 129-153.

Powell- Crain, T (2020, Mar 26, 16.07) "[State] schools closed for the rest of year, instruction goes online" Local Newspaper.

Powell-Crain, T (2020, Mar 26, 17.16) "[State] schools closed for the rest of the year, instruction goes online" Local Newspaper.

Prigogine, A. I. (1995). "Contemporary sociology of the organization". Moscow: Interprax.

Pslek, P.E. (1995) "Some Emerging Principles for Managers of Complex Adaptive Systems".

  Retrieved from: http://www.directedcreativity.com/pages/ComplexityWP.html

Qin A., & Hernández J. C.(2020, January 10, Updated 2020, January 21) China Reports First

  Death From New Virus. New York TImes. Retrieved from:

  https://www.nytimes.com/2020/01/10/world/asia/china-virus-wuhan-death.html

Rabin, R. C., (2020, January 21, Updated May 7, 2020) First Patient With Wuhan Coronavirus Is

  Identified in the U.S. New York Times. Retrieved from:

  https://www.nytimes.com/2020/01/21/health/cdc-coronavirus.html

Ramzy, A., & May T. (2020, February 2) Philippines Reports First Coronavirus Death Outside

  China. New York Times. Retrieved from:

  https://www.nytimes.com/2020/02/02/world/asia/philippines-coronavirus-china.html

Ramzy, A., Wang, V., Myers, S.L., Goldman, R., Yu, E., Paddock, R, C.,Dooley, B.,Rich,

  M.,Wang, A., Mou, Z., Zhang, A., Wang, Y., Fu, C., Qin, A., Wee, S-L., Buckley, C.,

  Specia, M., Smialek, J., Nechepurenko I., & Magra, I. (2020, February. 11, Updated March

  12) The Illness Now Has a Name, COVID-19. Ney York Times. Retrieved from:

  https://www.nytimes.com/2020/02/11/world/asia/coronavirus-china.html?action=click&mo

  dule=Top%20Stories&pgtype=Homepage

Ravitch, D. (2016). *The death and life of the great American school system: How testing and

  choice are undermining education*. Basic books.

Reushle, S. (2005). Inquiry into a transformative approach to professional development for

  online educators.

Rule P., & John V. M., (2015). "A Necessary Dialogue: Theory in Case Study Research".

  International Journal of Qualitative Methods, 1-11. DOI: 10.1177/1609406915611575

Rumsfeld D. (2002) "Secretary of Defense news briefing: the limitations of intelligence reports" February 12.

Schneider, M., & Somers, M. (2006). Organizations as complex adaptive systems: Implications of complexity theory for leadership research. The Leadership Quarterly, 17(4), 351-365. doi: 10.1016/j.leaqua.2006.04.006

Schon, D. A. (1983). 1983, The reflective practitioner: How professionals think in action. New York: Basic Books.

Sharma, A., Alvi, I. Evaluating pre and post COVID 19 learning: An empirical study of learners' perception in higher education. *Educ Inf Technol* 26, 7015–7032 (2021). https://doi.org/10.1007/s10639-021-10521-3

Simon, H. (1962). The architecture of complexity. Proceedings of the American Philosophical Society. *Garud R., KumaraswamY A. et R.-N. Langlois,«Managing in the modular age»(2003), Blackwell Publishing, Oxford*, 15-38. Simon H.A. (1981) : The Sciences of the Artificial (2nd ed.), (MIT Press, Cambridge MA).

Small M. L., (2009) 'How many cases do I need?'On science and the logic of case selection in field-based research"http://eth.sagepub.com Vol 10(1): 5–38[DOI: 10.1177/1466138108099586]

Snowden D., (2010). "Chaos and complexity Theory". Linchpin Systems. Retrieved from: https://www.linchpin.systems/chaos-and-complexity-theory/

Snyder, S. (2013), "The Simple, the Complicated, and the Complex: Educational Reform Through the Lens of Complexity Theory", OECD Education Working Papers, No. 96, OECD Publishing. http://dx.doi.org/10.1787/5k3txnpt1lnr-en

Spradley, James P. (1979). The Ethnographic Interview. New York: Holt, Rinehart and Winston.

Sridhar, D., & Majumder, M.S.,(2020). "Modelling the Pandemic - Over-reliance on modelling

    leads to missteps and blind spots in our response". British Medical Journal 21 April**;** 369.

    Retrieved from: https://doi.org/10.1136/bmj.m1567

Stacey R. D., (2002). "Strategic management and organisational dynamics: the challenge of

    complexity". 3rd ed. Harlow: Prentice Hall.

Stacey, R. D., Griffin, D. And Shaw, P. (2000) "Complexity and Management: fad or radical

    challenge to systems thinking?" London: Routledge (658.4 STA)

Stacey, R. D. (1996). "Complexity and Creativity in Organizations". San Francisco:

    Berrett-Koehler Publishers

Stake, R. E. (1995). "The Art of Case Study Research". sage.

Stewart, M. (2001) The Co-Evolving Organization Rutland, UK: Decomplexity Associates Ltd.).

    http://www.decomplexity.com/Coevolving%20Organization%20VU.pdf.

Surie, G., & Hazy, J. K. (2006) Generative leadership: Nurturing innovation in complex systems.

    Emergence: Complexity and Organization 8(4): 13–26.

Sutcher, L., Darling-Hammond, L., & Carver-Thomas, D. (2016). A coming crisis in teaching?

    Teacher supply, demand, and shortages in the US. *Learning Policy Institute*.

Taub, A. (2020) "*Why Are Women-Led Nations Doing Better With COVID-19"?*New York

    Times, Published May 15, Updated Aug. 13.Retrieved from

    https://www.nytimes.com/2020/05/15/world/coronavirus-women-leaders.html

Taylor, D. B. (2020, May 5) How the Coronavirus Pandemic Unfolded: a Timeline. New York

    TImes. Retrieved from:

    https://www.nytimes.com/article/coronavirus-timeline.html

Tilly, C. (2004). Past, present, and future globalization. *The global politics of educational borrowing and lending*, 13-28.

Thom, R., (1972) "Stabilité Structurelle et Morphogenèse". Benjamin, New York.

Thomas, C., Kaminska-Labbé, R., & McKelvey, B. (2005). Managing the MNC and exploitation/exploration dilemma: From static balance to dynamic oscillation. Advances in strategic management: Expanding perspectives on the strategy process, 22, 213-250.

Tosey P., (2002) "Teaching On The Edge Of Chaos Complexity Theory, Learning Systems And Enhancement."

Turner, J. R., & Baker R., M. (2019) Complexity theory: An overview with potential Applications for the Social Sciences" Systems, 7, 4.

Tyack, D., & Tobin, W. (1994). The "Grammar" of Schooling: Why Has It Been So Hard to Change? *American Educational Research Journal*, *31*(3), 453–479. https://doi.org/10.2307/1163222

Uhl-Bien, M., Marion, R., & McKelvey, B. (2007). Complexity leadership theory: Shifting leadership from the industrial age to the knowledge era. The leadership quarterly, 18(4), 298-318.

Uhl-Bien, M., & Marion, R. (2009). Complexity leadership in bureaucratic forms of organizing: A meso model. The Leadership Quarterly, 20(4), 631-650.

Uhl-Bien, M., & Marion, R. (2008). Complexity leadership–A framework for leadership in the twenty-first century. *Complexity leadership*, 6-24.

Uhl-Bien, M. (2006). Relational leadership theory: Exploring the social processes of leadership and organizing. The leadership quarterly, 17(6), 654-676.

UNESCO (2023) Education: from school closure to recovery Retrieved 29 May 2023, from

   https://www.unesco.org/en/covid-19/education-response

Vroom, V. H., & Yetton, P. W. (1973). *Leadership and decision-making* (Vol. 110). University of

   Pittsburgh Pre.

Wang V. X., (2016)." Encyclopedia of Strategic Leadership and Management" (3 Volumes)

   Florida Atlantic University, USA

Ward K., & Street C., (2010) "Reliability". Encyclopedia of Case Study Research, SAGE

   Publications, Inc., Thousand Oaks p801-802 retrieved from:

   http://dx.doi.org/10.4135/9781412957397.n293

Weber M. (1947). The theory of social and economic organization (Henderson A. M.Parsons T. ,

   Trans.). New York: Oxford.

Weick KE (1995) Sensemaking in Organization. Thousand Oaks, CA: Sage Publications.

Weick KE and Roberts KH (1993) Collective mind in organization: Heedful interrelating on

   flight decks. Administrative Science Quarterly 38: 357–381.

Weick, K. E. (1979). *The social psychology of organizing*, 2nd edn. Reading, MA:

Addison-Wesley.

Weick,K. E. (1976). Educational organizations as loosely coupled

   systems. Administrative Science Quarterly, 21,1—19.

World Economic Forum (2020). *4 ways COVID-19 could change how we educate future*

   generations.

   https://www.weforum/agenda/2020/03/4-ways-COVID-19-education-future-generations.

World Health Organisation (2020a, January) Novel Coronavirus (2019-nCoV) SITUATION

    REPORT - 1 21 JANUARY 2020, Data as reported by: 20 January 2020. Geneva,

    Switzerland Retrieved from:

    https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200121-sitrep-1-

    2019-ncov.pdf?sfvrsn=20a99c10_4

World Health Organisation (2020b, 30 January) Statement on the second meeting of the

    International Health Regulations (2005) Emergency Committee regarding the outbreak of

    novel coronavirus (2019-nCoV) Statement Geneva, Switzerland. Retrieved from:

    https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-th

    e-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-

    novel-coronavirus-(2019-ncov)

World Health Organisation [@WHO] (2020 February 11) Daily media briefing. Retrieved from:

    https://www.pscp.tv/w/1ZkKzLweLlZJv

Yawn, A.J. (2018, August 6, 11.49) "GW goes, GMS grows: what happens when a school adds

    more than 200 Students"? Local newspaper

Yin, R. K. (2003). Case study research: Design and methods. Thousand Oaks, Calif: Sage

    Publications.

Yue A. R.,(2010) "Validity". Encyclopedia of Case Study Research. SAGE Publications, Inc.

    Thousand Oaks p968-963 retrieved from: http://dx.doi.org/10.4135/9781412957397.n353

Yukl, G., & Mahsud, R. (2010). Why flexible and adaptive is essential. Consulting *Psychology*

    Journal Practice and Research, 62(2). 81–93.

Zhao, Y. (2020), "COVID-19 as a catalyst for educational change", Prospects, pp. 1-5, doi:

    10.1007/ s11125-020-09477-y.
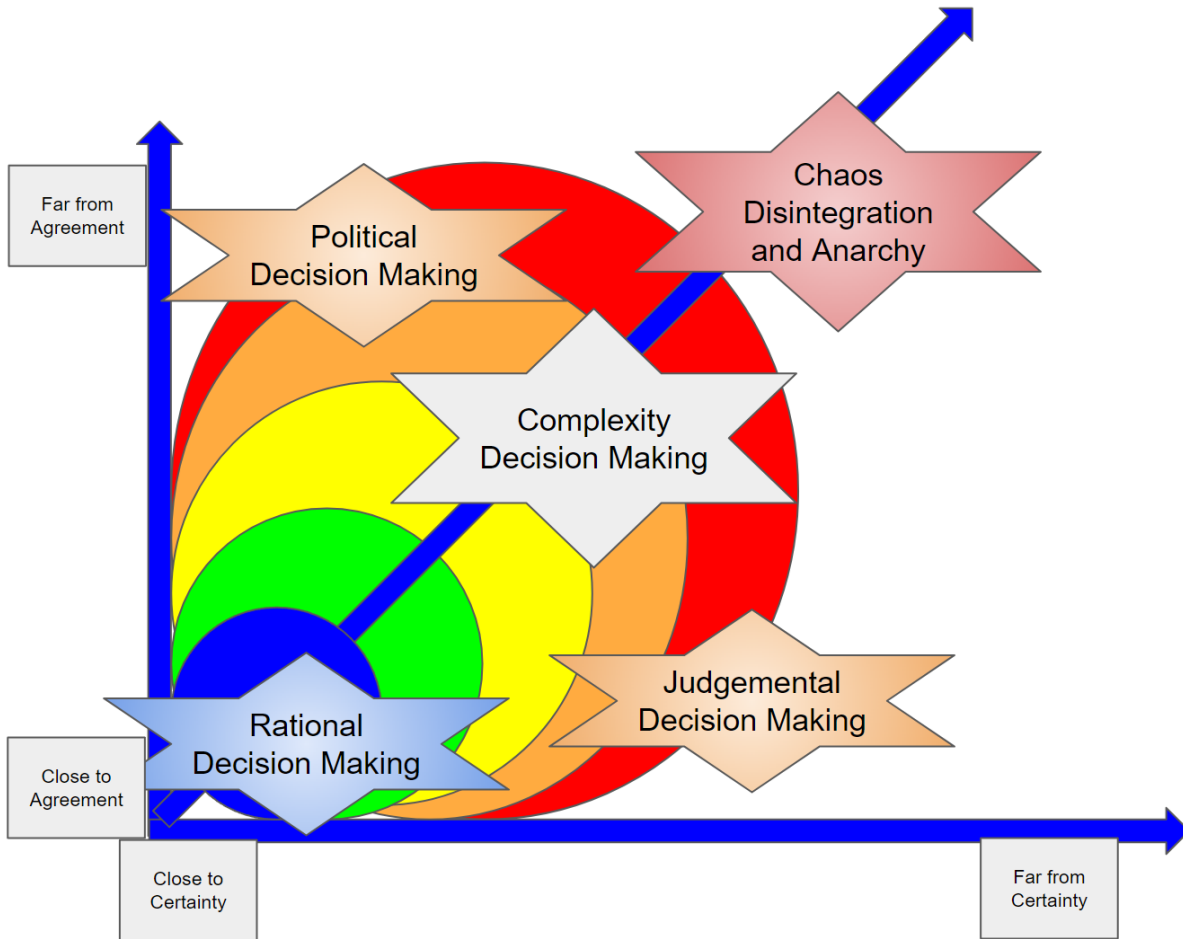
The decision-making process in changing environments, adapted from the Stacey Matrix (Stacey 2002)

Appendix B

A Summary of Leadership Functions and Their Mechanisms.

Appendix C

Reflective questions for enacting the CHE principles in semi-structured interviews in educational research. Brown & Danaher (2020, p85)

Connectivity.

1. What strategies can be adopted to help to build trust and overcome experiences of vulnerability, cautiousness and apprehension?
2. How should I dress when meeting and conducting interviews with research participants?
3. Is the language of the participant information sheet and consent form sufficiently clear and informative without being inaccessible?
4. How can I provide potential participants with enough information to ensure that they give their fully informed consent to participate without influencing their responses?
5. How can I maximize credibility and trust with participants whom I have never previously met?
6. How can I read accurately the verbal and non-verbal signals to understand how I am perceived by the (potential) participants?
7. Is it possible to balance aspects of reciprocity in terms of how much information I give and share as part of building relationships and connections?
8. How can I shorten the distance between myself as the researcher and the participants?

Humanness.

1. How can I demonstrate humanness and a degree of informality without being seen as unprofessional?
2. How can I use the interview to identify the separate and shared interests held by the participant/s and myself?
3. How can I avoid making inaccurate or inappropriate promises or commitments about how potential interviewers might benefit from participating in the research?
4. Are there specific aspects of semi-structured interviewing to consider and employ when interviewing people who are variously constructed as 'disadvantaged' or 'marginalised'?
5. What is the balance between sharing relevant aspects of my own humanness on the one hand and my voice and experience dominating the discussion on the other?
6. How far should I go in terms of blurring the boundaries between my role as a researcher and those of being a 'sharer of information', a 'confidant' and a 'friend'?
7. How can I overcome emotions expressed by participants such as vulnerability, cautiousness and apprehension?
8. How can I recognize whether there is an appropriate and equitable balance of power in the relationship between myself and the participants?

9. How can I convey that participants are not being judged and that I am genuinely interested in their stories and the uniqueness of their contexts?

Empathy.

1. How can I move the interview process away from being one of interrogation to one that is much more in tune with developing enduring relationships with participants and that in turn acknowledges and values their contributions and positions?
2. How easily can empathy shade into being perceived as endorsing or critiquing specific attitudes, behaviours and values on the part of the participants or others?
3. To what extent can and should empathy function as the bridge between self and other/ness?
4. How might participants portray my empathy with other community members and/or others after the conclusion of the interview or the research?

Appendix D

The study explored the following research question:

How did the decision-making processes of traditional leadership roles change through the interaction of the four functions of complex leadership theory in a title one middle school, in response to the COVID -19 crisis?

Questions for Interviews

To address my research questions, I require interview input from both leadership, and teachers. The language used to pose the questions will be different for these two groups as I am addressing people with different experiences. The principal has a postgraduate education and therefore understands the research and interview process. The faculty do not necessarily have this interest or experience. This adjustment of questions and adaptation to the situation is in line with the connectivity principles of Brown and Danaher (2000).

<u>Questions for the Principal / Assistant Principal</u>

- *Tell me about your decision-making process during the COVID-19 lockdown? How did you make decisions during the lockdown period?*

This speaks directly to the research question and specifically asks about the decision-making process. This question is appropriate for this level of educational administration. The answers can then be analyzed using the generative, administrative and community building processes discussed in chapter two to indicate complex leadership. There may also be information on information using and information gathering that support the three amin functions.

- *How did your decision-making process change during the COVID-19 lockdown compared to during "normal times"?*

Again, this speaks directly to the research question and will inform analysis using the three leadership functions.

- *Did you specifically encourage community involvement in the decision-making process during the lockdown? How did you do this?*

  Did you monitor the group pages on Facebook?

Comparing this to the teacher answers will show if the generative conditions were successfully put in place to encourage emergence. Also, this speaks to community building and enabling citizenship behavior.

- *How did you keep the community and the faculty informed of your decisions during the crisis?*

This question speaks to how information was gathered and used in the decision-making process.

- *Was there an intentional change to your decision-making strategy or was it organic to the situation?*

The intentionality of the change shows an awareness of the change in community interactions and a purposeful adaptation.

- *How did you feel your role changed during the lockdown period?*

A personal reflection on the changing roles may speak to the decision-making processes.

- *What was different about leading during a crisis to leading in a "normal" situation every day?*

This question asks for reflection and comparison and will hopefully begin to encourage memories of the event and how it was different form "normal times"

- *Did you find you were influenced from new directions? How much influence did parents and teachers have on your decision-making process? Did you encourage this feedback? What did you do with this feedback?*

I want to investigate the influences that the leadership felt there was from "non-traditional" directions and whether they embraced this.

- *Did you purposely encourage community involvement in decision making during the lockdown?*

This speaks to the theoretical framework and whether administration was actively encouraging generative and community building mechanisms

- *How much did parents and other stakeholders influence your decision-making process during the lockdown?*

Did administration consciously acknowledge the influence of the parents?

- *How do you think your leadership role changed during the crisis?*

<u>Questions for Teachers / Faculty</u>

- *Did you / How did you communicate with administration during the lockdown?*

This will tell me if there are avenues of communication that I have not considered and will indicate what the most popular form of communication was?

- *Did you feel that this form of communication encouraged? Can you remember what gave you that impression?*

The feeling of encouragement speaks to the decision-making processes of administration as to whether the views of the community were encouraged and listened to.

- *Did you suggest changes to the way things were done? What were they?*

This specific question identifies actual decisions and resultant changes that were made and the influence the aggregates had in this process.

- *Did it make any difference to how things were done?*

The perception that processes or policies were changed because of their interaction is a key indicator to complex adaptive systems where leadership events are emerging from the aggregate interaction.

- *Did any teaching policies change during lockdown? Did you notice any changes to your students learning during lockdown? What changes did you see as the lockdown progressed?*

This question addresses actual changes that happened or were perceived to happen during the lockdown and indicates if the aggregates feel they had any influence over these events occurring.

- *Tell me about your experience with school during the COVID-19 lockdown? Did you feel that policies and procedures changed as time went on? Why do you think those policies changed?*

Identifying a change will identify a potential leadership event. Finding out why teachers think the administration changed their policies identifies decision making.

- *Do you feel the COVID-19 crisis school lockdown developed or did it stay the same throughout? Did we finish the same way we started? What changed? Why do you think it changed?*

If a teacher cannot identify changes in policies from the first question a comparison of the start and the end may help to show change and decision making. Asking why a policy changed may identify a leadership event.

- *Did the school encourage you to communicate about your experience? How did they do that? What did you do? Why did you do that?*

This question addresses if the teachers were responsible for some of the emergent leadership events and had formed aggregates like those of parents.

- *Did you talk to other teachers about things that you thought need to be changed? What medium did you use for this? Did you ever formally or informally talk to admin about your suggestions? What was their response?*

This question further investigates the teachers' role in the decision-making policy of administration.

Appendix E

AUBURN UNIVERSITY INSTITUTIONAL REVIEW BOARD for RESEARCH INVOLVING HUMAN SUBJECTS

PROTOCOL REVIEW FORM
FULL BOARD or EXPEDITED REVIEW

For assistance, contact: **The Office of Research Compliance (ORC)**
Phone: **334-844-5966** E-Mail: IRBAdmin@auburn.edu Web Address: http://www.auburn.edu/research/vpr/ohs
Submit completed form and supporting materials as one PDF through the IRB Submission Page
Form must be populated using Adobe Acrobat / Pro 9 or greater standalone program (do not fill out in browser). Handwritten forms are not accepted.
Where links are found hold down the control button (Ctrl) then click the link.

1. Proposed Start Date of Study: 4/1/2022   Today's Date: **April 3rd 2022**
Submission Status (Check One): ☐ New   ☒ Revisions (to address IRB Review Comments)
Proposed Review Category (Check One): ☐ Full Board (greater than minimal risk)   ☒ Expedited
If Expedited, Indicate Category(ies) ((Link to Expedited Category Review Sheet) 6

2. Project Title: A study of Complex leadership theory in a title one middle school during the CoVID-19 outbreak of 2020 (#21-549)

3. Principal Investigator (PI): Elizabeth Parker   Degree(s): PhD Ed Leadership
Rank/Title: Graduate Student   Department/School: ED Leadership
Role/resposibilitesinthisproject:Todesign,conduct and report a research project. To protect the rights and privacy of participants os the study and to ensure the protection of data
PreferredPhoneNumber:2104521346   AU Email: eap0036@auburn.edu
Faculty Advisor Principal Investigator (if applicable): Dr Ellen Hahn
Rank/Title: **Professor**   Department/School: EFLT
Role/responsibilities in this project: **To oversee study and to share expertise that guides PI with the collection and analysis of data; and reporting of findings. To ensure compliance with ethical standards throughout the data collection, analysis, and findings until the completion of the study.**
Preferred Phone Number: **3348443067**   AU Email: reamseh@auburn.edu

Department Head: **Dr James Satterfield**   Department/School: **EFLT**
Preferred Phone Number: **3348443060**   AU Email: JWS0089@auburn.edu
Role/responsibilities in this project: To cooperate with the administration in the application and enforcement of all Auburn University policies and procedures, as well as all applicable federal, state, and local laws regarding the protection and ethical treatment of human participants by researchers in my department.

4. Funding Support: ☒ N/A ☐ Internal External Agency: Click or tap here to enter text. Pending ☐ Received ☐
For federal funding, list funding agency and grant number (if available): Click or tap here to enter text.

5. a) List any contractors, sub-contractors, other entities associated with this project: N/A
b) List any other AU IRB approved protocols associated with this study and describe the association: N/A

c) List any other institutions associated with this study and submit a copy of their IRB approvals: Montgomery Public Schools (submitted as attachment in appendix)

Protocol Packet Checklist
Check all applicable boxes. A completed checklist is required.
☒   Protocol Review Form (All required signatures included and all sections completed)
   (Examples of appended documents are found on the website: https://cws.auburn.edu/OVPR/pm/compliance/irb/sampledocs)

☒   CITI Training Certificates for key personnel

☒   Consent Form or Information Letter and any releases (audio, video or photo) that participants will review and/or sign

☒   Appendix A "Reference List"

☒   Appendix B if e-mails, flyers, advertisements, social media posts, generalized announcements or scripts, etc., will be used to recruit participants.

☒	Appendix C if data collection sheets, surveys, tests, other recording instruments, interview scripts, etc. will be used for data collection. Attach documents in the order they are listed in item 13c. Continued on Page 2
☒	Appendix D if they study will use a debriefing form or will include emergency plans/ procedures and medical referral lists. (A referral list may be attached to the consent document.)
☒	Appendix E if research is being conducted at sites other than Auburn University or in cooperation with other entities. A **permission letter** from the site/ program director must be included indicating their cooperation or involvement in the project. NOTE: If the proposed research is a multi-site project, involving investigators or participants at other academic institutions, hospitals or private research organizations, a letter of **IRB approval** from each entity is required prior to initiating the project.
☒	Appendix F Written evidence of approval by the host country, local IRB or institutions if research is conducted outside the United States

6. General Research Project Characteristics

6A. Research Methodology

Check all descriptions that best apply to the research methodology.

Data Source(s): ☒ New Data ☐ Existing Data | Will recorded data directly or indirectly identify participants? ☒ Yes ☐ No

Data collection will involve the use of:

☐	Educational Tests (cognitive diagnostic, aptitude, etc.)	☒	Internet / Electronic
☒	Interview	☒	Audio
☒	Observation	☐	Video
☐	Locations or Tracking Measures	☐	Photos
☐	Physical / Physiological Measures or Specimens (see section 6E)	☐	Digital Images
☐	Surveys / Questionnaires	☐	Private records or files
☐	Other: Click or tap here to enter text.		

6B. Participant Information

Check all descriptors that apply to the TARGET population.
(link to definition of target population)
☒ Males ☒ Females ☐ AU students

Vulnerable Populations
☐ Pregnant Women/Fetuses ☐ Prisoners ☐ Institutionalized
☐ Children and / or Adolescents (under age 18 in AL)

Persons with:
☐ Economic Disadvantages ☐ Physical Disabilities
☐ Educational Disadvantages ☐ Intellectual Disabilities

Will participants be compensated? ☐ Yes ☒ No

6C. Risks to Participants

Identify all risks participants might encounter in this research.

☒	Breach of Confidentiality*	☒	Coercion
☐	Deception	☐	Physical
☒	Psychological	☐	Social
☐	None		
☐	Other (COVID-19, other medical):		

Click or tap here to enter text.

*Note that if the investigator is using or accessing confidential or identifiable data, reach of confidentiality is always a risk.

D. Corresponding Approval/ Oversight

- Does the study include participant exposure to radiation? ☐ Yes ☒ No
  If yes indicate: ☐ DEXA ☐ PQCT ☐ Other

- Is IBC Approval required for this study?
  ☐ Yes ☐ No

  If yes, BUA # Click or tap here to enter text. Expiration Date Click or tap to enter a date.

- Is IACUC Approval required for this study?
  ☐ Yes ☒ No

  If yes, PRN # Click or tap here to enter text. Expiration Date Click or tap to enter a date.

- Does this study involve the Auburn University MRI Center?
  ☐ Yes ☐ No

Which MRI(s) will be used for this project? (Check all that apply)
☐ 3T   ☐ 7T

Does any portion of this project require review by the MRI Safety Advisory Council?
☐ Yes   ☒ No

Signature of one MRI Center Representative:_____
Required for all projects involving the AU MRI Center
Appropriate MRI Center Representatives:
    Dr. Thomas S. Denney, Director AU MRI Center
    Dr. Ron Beyers, MR Safety Officer

7. Project Assurances

7A. Principal Investigator's Assurances

1. I certify that all information provided in this application is complete and correct.
2. I understand that, as Principal Investigator, I have ultimate responsibility for the conduct of this study, the ethical performance this project, the protection of the rights and welfare of human subjects, and strict adherence to any stipulations imposed by the Auburn University IRB.
3. I certify that all individuals involved with the conduct of this project are qualified to carry out their specified roles and responsibilities and are in compliance with Auburn University policies regarding the collection and analysis of the research data.
4. I agree to comply with all Auburn policies and procedures, as well as with all applicable federal, state, and local laws regarding the protection of human subjects, including, but not limited to the following:
    a. Conducting the project by qualified personnel according to the approved protocol
    b. Implementing no changes in the approved protocol or consent form without prior approval from the Office of Research Compliance
    c. Obtaining the legally effective informed consent from each participant or their legally responsible representative prior to their participation in this project using only the currently approved, stamped consent form
    d. Promptly reporting significant adverse events and / or effects to the Office of Research Compliance in writing within 5 working days of the occurrence.
5. If I will be unavailable to direct this research personally, I will arrange for a co-investigator to assume direct responsibility in my absence. This person has not been named as co-investigator in this application, or I will advise ORC, by letter, in advance of such arrangements.
6. I agree to conduct this study only during the period approved by the Auburn University IRB.
7. I will prepare and submit a renewal request and supply all supporting documents to the Office of Research Compliance before the approval period has expired if it is necessary to continue the research project beyond the time period approved by the Auburn University IRB.
8. I will prepare and submit a final report upon completion of this research project.

My signature indicates I have read, understand and agree to conduct this research project in accordance with the assurances listed above.

Elizabeth Parker	Elizabeth Parker	20 \ 01 / 2022
Principal Investigator Name	**Principal Investigator Signature**	**Date**

7B. Faculty Advisor / Sponsor's Assurances

1. I have read the protocol submitted for this project for content, clarity, and methodology.
2. By my signature as faculty advisor / sponsor on this research application, I certify that the student or guest investigator is knowledgeable about the regulations and policies governing research with human subjects and has sufficient training and experience to conduct this particular study in accord with the approved protocol.
3. I agree to meet with the investigator on a regular basis to monitor study progress. Should problems arise during the course of the study, I agree to be available, personally, to supervise the investigator in solving them.
4. I assure that the investigator will promptly report significant incidents and / or adverse events and / or effects to the ORC in writing within 5 working days of the occurrence.
5. If I will be unavailable, I will arrange for an alternate faculty sponsor to assume responsibility during my absence, and I will advise the ORC by letter of such arrangements. If the investigator is unable to fulfill requirements for submission of renewals, modifications or the final report, I will assume that responsibility.

Revised 04/02/2022

Ellen Reames Hahn

Faculty Advisor / Sponsor Name	**Faculty Advisor Signature**

4/22/2022

Date

7C. Department Head's Assurance

By my signature as department head, I certify that I will cooperate with the administration in the application and enforcement of all Auburn University policies and procedures, as well as all applicable federal, state, and local laws regarding the protection and ethical treatment of human participants by researchers in my department

James Satterfield

4/25/2022

Department Head Name	**Department Head Signature**	**Date**

8. Project Overview:

8A.   A summary of relevant research findings leading to this research proposal:

(Cite source; include a "Reference List" as Appendix A.)

Complexity Leadership Theory postulates that leadership is not solely the domain of a traditional leadership position but is a series of events that emerge from a population. The events and their influences can only be accurately identified after the event has occurred. Building on the work of Stacey (2002), who proposes that complexity leadership occurs at the edge of chaos, and the work of Hazy and Uhl-Bien (2011, 2015), who have proposed leadership functions and their mechanisms to describe complexity leadership, this research will use case study methodology to build an understanding of how decision-making processes, of traditional leadership positions changed during the CoVID-19 lockdown of 2020.

8B.   A brief summary/abstract of the study methodology, including design, population, and variables of interest.

(350 word maximum, in language understandable to someone who is not familiar with your area of study):

This is an instrumental case study design, where the case is a community of a Title 1 Middle School in Montgomery, Alabama and the study is the leadership decision-making in an education community that can be described as a complex adaptive system (Albert et al., 2015; Pslek, 1995; Aagaard 2012, p732; Chiva 2014 as cited in Turner 2019), using complexity leadership theory as the conceptual framework. I will use semi-structured, ethnographic, interviews with stakeholders, including teachers, parents, paraprofessionals, and the school and district administration. There will be up to 20 interviewees total, with four of those being administration. During the interviews participants may indicate that they have personal emails that would contribute to the evidence for the study. Consent to view these emails will be obtained separately. I will do a context analysis of the interview transcripts along with an analysis of the personal emails, observation notes and the other artifacts to provide construct validity. I will look for patterns indicating emergent leadership events within the community, using the evidence in the artifacts to identify the event through the lens of complexity leadership theory. As a current member of faculty I have access to archived emails from administration to staff. I have also saved all the relevant Facebook posts from a private Facebook page (of which I am member).

9. Purpose

9A. State the purpose of the study and all research questions or aims.

The purpose of this study is to provide a better understanding of how diverse influences throughout the community can play a significant role in influencing decision-making processes during periods of massive change for example the CoVID-19 lockdown of 2020. I will use the lens of complexity leadership theory to frame my understanding. My three research questions are: How did the decision-making processes of traditional leadership roles change through the interaction of different aggregates and actors in the Title 1 Middle School Community, in response to the COVID-19 crisis? How did internal stakeholders influence the decision-making

process and what mechanisms emerged for different actors to influence policy during the outbreak? How did leaders perceptions of their roles change during the pandemic?

9B. Describe how results of this study will be used? (e.g., presentation? publication? thesis? dissertation?)
The results of this research will be used for my dissertation to be submitted to the Graduate Faculty of Auburn University in partial fulfillment of the requirements for the Degree of Doctor of Philosophy, and may also be used to create presentations or publications.

10. Key Personnel. Describe responsibilities as specifically as possible. Include information on research training or certifications related to this project. **To determine key personnel see decision tree at https://cws.auburn.edu/OVPR/pm/compliance/irb/training. Submit a copy of CITI training documentation for all key personnel.** (For additional personnel, add lines as needed).

To determine Auburn University HIPAA – covered entities click link to HIPAA Policy.

If any key personnel have a formal association with institutions/entities involved in the study (for example is an employee or supervisor at the site research will occur), describe that affiliation. For all non-AU affiliated key personnel, submit a copy of their IRB approval.

Principal Investigator: Elizabeth Parker   **Rank/Title:** Graduate Student
Email Address: eap0036@auburn.edu   **Degree(s):** PhD Ed Leadership
Dept / Affiliation: ED Leadership   **HIPAA Covered Entity? Yes ☐ No ☒**
<u>**Roles / Responsibilities:**</u> **To design, recruit and consent participants in accordance with the IRB protocol, conduct, and report a research project. To protect the rights and privacy of participants of the study and to ensure protection of data.**
- AU affiliated? ☒ Yes ☐ No   If no, name of home institution: Click or tap here to enter text.
- Plan for IRB approval for non-AU affiliated personnel? Click or tap here to enter text.
- Do you have any known competing financial interests, personal relationships, or other interests that could have
  influence or appear to have influence on the work conducted in this project?   ☐ Yes   ☒ No
- If yes, briefly describe the potential or real conflict of interest: Click or tap here to enter text.
- Completed required CITI training? ☒ Yes   ☐ No If NO, complete the appropriate CITI basic course and update
  the revised Exempt Application form.
- If YES, choose course(s) the researcher has completed: Human Sciences Basic Course   Expiration Date
                                                          Refresher Course   Expiration Date

Individual: Dr Ellen Hahn   **Rank/Title:** Professor
Email Address: reameseh@auburn.edu   **Degree(s):** PhD
Dept. / Affiliation: Ed Leadership   **HIPAA Covered Entity? Yes ☐ No ☒**
<u>**Roles / Responsibilities:**</u> Faculty Advisor
- AU affiliated? ☒ Yes ☐ No   If no, name of home institution:
- Plan for IRB approval for non-AU affiliated personnel?
- Do you have any known competing financial interests, personal relationships, or other interests that could have
  influence or appear to have influence on the work conducted in this project?   ☐ Yes   ☒ No
- If yes, briefly describe the potential or real conflict of interest:
- Completed required CITI training? ☒ Yes   ☐ No If NO, complete the appropriate CITI basic course and update
  the revised Exempt Application form.
- If YES, choose course(s) the researcher has completed: Choose a course   Expiration Date
                                                          Choose a course   Expiration Date

Individual: Click or tap here to enter text.   **Rank/Title:** Choose Rank/Title

Email Address: Click or tap here to enter text.   **Degree(s):** Click or tap here to enter text.

Dept. / Affiliation: Choose Department/School   **HIPAA Covered Entity? Yes ☐ No ☐**

Roles / Responsibilities: Click or tap here to enter text.

- AU affiliated? ☐ Yes ☐ No If no, name of home institution: Click or tap here to enter text.
- Plan for IRB approval for non-AU affiliated personnel? Click or tap here to enter text.
- Do you have any known competing financial interests, personal relationships, or other interests that could have influence or appear to have influence on the work conducted in this project? ☐ Yes ☐ No
- If yes, briefly describe the potential or real conflict of interest: Click or tap here to enter text.
- Completed required CITI training? ☐ Yes ☐ No If NO, complete the appropriate CITI basic course and update the revised Exempt Application form.
- If YES, choose course(s) the researcher has completed: Choose a course   Expiration Date
                                          Choose a course   Expiration Date

Individual: Click or tap here to enter text.   **Rank/Title:** Choose Rank/Title

Email Address: Click or tap here to enter text.   **Degree(s):** Click or tap here to enter text.

Dept. / Affiliation: Choose Department/School   **HIPAA Covered Entity? Yes ☐ No ☐**

Roles / Responsibilities: Click or tap here to enter text.

- AU affiliated? ☐ Yes ☐ No If no, name of home institution: Click or tap here to enter text.
- Plan for IRB approval for non-AU affiliated personnel? Click or tap here to enter text.
- Do you have any known competing financial interests, personal relationships, or other interests that could have influence or appear to have influence on the work conducted in this project? ☐ Yes ☐ No
- If yes, briefly describe the potential or real conflict of interest: Click or tap here to enter text.
- Completed required CITI training? ☐ Yes ☐ No If NO, complete the appropriate CITI basic course and update the revised Exempt Application form.
- If YES, choose course(s) the researcher has completed: Choose a course   Expiration Date
                                          Choose a course   Expiration Date

Individual: Click or tap here to enter text.   **Rank/Title:** Choose Rank/Title

Email Address: Click or tap here to enter text.   **Degree(s):** Click or tap here to enter text.

Dept. / Affiliation: Choose Department/School   **HIPAA Covered Entity? Yes ☐ No ☐**

Roles / Responsibilities: Click or tap here to enter text.

- AU affiliated? ☐ Yes ☐ No If no, name of home institution: Click or tap here to enter text.
- Plan for IRB approval for non-AU affiliated personnel? Click or tap here to enter text.
- Do you have any known competing financial interests, personal relationships, or other interests that could have influence or appear to have influence on the work conducted in this project? ☐ Yes ☐ No
- If yes, briefly describe the potential or real conflict of interest: Click or tap here to enter text.
- Completed required CITI training? ☐ Yes ☐ No If NO, complete the appropriate CITI basic course and update the revised Exempt Application form.
- If YES, choose course(s) the researcher has completed: Choose a course   Expiration Date
                                          Choose a course   Expiration Date

11. Location of research.

11A. List all locations where data collection will occur. Attach permission letters as Appendix E. (School systems, organizations, businesses, buildings and room numbers, servers for web surveys, etc.) **Be as specific as possible.** (See sample letters at https://cws.auburn.edu/OVPR/pm/compliance/irb/sampledocs)

      Locations data collection will take place (1) interviews: Interviews will take place at the Goodwyn Middle school in room 227 or in local open spaces, for example on the park benches behind the school. In both locations social distancing will be maintained and will conform with local government guidelines regarding COVID-19. . I will encourage

interviewees to wear masks at all times and I will encourage the participant to hand sanitize before and after the interview. I will constantly review government guidelines to ensure that my interviews are within regulations set out by both the Federal and State legislators **and/or I will also use the AU server using ZOOM where participants prefer/request this method. Montgomery Public School District headquarters, Montgomery, Alabama. (2) archived data from Facebook: AU server, (3) archived data from staff meetings: AU server (4) archived data from emails: AU server/ AU email.**

11B. Will study data be stored within a HIPAA covered facility? Yes ☐ No ☒

If yes, which facility(ies) (To determine AU HIPPA covered entities, go to VII of the HIPPA Hybrid Entity Policy):
Click or tap here to enter text.

12. Participants

12A. Describe the targeted/ intended participant population for the study including the number of participants and inclusion and exclusion criteria for participant selection.

☒ **Check here if existing data will be used and describe the population from whom data was collected including the number of data files.**

☐ **Check here if permission to access existing data is required and submit a copy of the agreement to access.**

Participants are members of the Goodwyn Middle School Community; they are directly connected to the school through a student or employment. Inclusion criteria for the two groups of participants are: (1) Participants will have self-identified as parents or faculty and staff who wrote emails to the school or district administration about their personal or their student's experiences during lock down. (2) Participants will be a member of the school or district administration, in a decision making process during lock down, who were recipients of the correspondences from parents and staff group (1). Existing data for the study includes 2 data files. One data file is from 2020 Facebook posts. The second data file is from email messages about the policy and procedures during the 2020 lock down. All names will be deleted and changed to pseudonyms before i save the files.

12B. Describe, step-by-step in lay language all procedures to recruit participants. Include in Appendix B a copy of all e-mails, flyers, advertisements, recruiting scripts, invitations, etc., that will be used to invite people to participate. (See sample documents at https://cws.auburn.edu/OVPR/pm/compliance/irb/sampledocs)

For parent participants I primarily intended to use snowball recruitment. I will ask (through recruiting script (1)) people I know in the community whether they wrote an email to administration during lockdown. My primary recruitment attempts will be informed by Facebook posts that included comments about the school. For the secondary level of recruitment for this group I will ask the primary level if they know anyone else who may have had similar reactions to the situation (recruiting script (2)) and also written to the administration I will also advertise on the community facebook page to ask for volunteers that communicated with administration during the lockdown. My recruitment script also includes details as to how I will use the data I collect. For administration recruitment I will send email requests (recruiting script (6)) to the members of administration who were involved in the policy decisions surrounding this study.

12C. Minimum number of participants required to validate the study? 10

Number of participants expected to enroll? 20

Is there a limit to the number of participants that will be included in the study?
☒ **No** ☐ **Yes, the number is** Click or tap here to enter text.

12D. Describe the process to compensate, amount and method of compensation and/or incentives for

participants. **AU Procurement and Business Services (PBS) policies**
(benefits to participants are NOT compensation)

If participants will <u>not</u> be compensated, check here: ☒
Indicate the amount of compensation per procedure and in total: Click or tap here to enter text.
Indicate the type of compensation: ☐ Monetary   ☐ Incentives
                                        ☐ Raffle or Drawing incentive (Include the chances of winning.)
                                        ☐ Extra Credit (State the value)
                                        ☐ Other

Describe how compensation will be distributed (USPS, email, etc.): Click or tap here to enter text.

13. Project Design & Methods

13A. Describe, <u>step-by-step</u>, all procedures and methods that will be used to <u>consent</u> participants. If a waiver is being requested, indicate the waiver, and describe how the study meets the criteria for the waiver. If minors will be enrolled describe the process to obtain parental/ legally authorized guardian permission.

☐ **Waiver of Consent (including using existing data)**

☐ Waiver of Documentation of consent (use of Information Letter)

☐ **Waiver of Parental Permission (for college students 18 years or younger)**

All research activities include the use of participants' names which will be changed to pseudonyms. I will recruit each participant by the recruitment letters (attached) which contains details about what the research is about, discussing with them what they are being asked to do, how long it will take, what the risks and benefits are, how the data will be used, how their privacy will be protected and by reminding them their participation is voluntary. If they indicate they are willing to participate I will contact them to arrange an interview at their convenience. I will ask each interviewee to read and sign a physical copy of "consent form" before each interview commences, I will give each interviewee their own copy of the document for their records. If the participant identifies that they have some correspondence they wish to share with me I will ask them to sign this portion of the form at the beginning of the interview. They can also sign this portion (email consent) at the end, if the interview identifies a correspondence that may be of interest. Participants may print the email they wish to share and give me a physical copy either by mail or by drop-off or they can send it electronically. Administration participants will be recruited in the same way as the other participants and again, if they agree, i will arrange an interview at their convenience. I will ask interviewees to read and sign a physical copy of "consent form" before each interview commences, I will give each interviewee their own copy of the document for their records. Again, administration may choose to send me some of their emails that I identify as useful during the interview and they can sign the "email consent" part of the form at the beginning or the end of the interview.
I will identify posts from Facebook that are relevant to my research and contact and consent the authors using the "email and electronic consent form" (attached in the appendix) through a direct message to establish contact and then an email correspondence with the consent form attached. The email of consent will then be identifiable data and I will treat it as such. I will identify emails from my own records that are relevant to my research and contact and consent the authors using the "email and electronic consent form" (attached in the appendix) through an email correspondence. The email consent will then be identifiable data and will be treated as such.

13B. In lay language, understandable by someone not familiar with the area of study, describe the complete research design and methods that will be used to address the purpose. Include a clear description of who, when, where and how data will be collected. Include specific information about participants' time and effort.

This study is going to look for the proposal of a leadership event through ethnographic, semi-structured interview, documentation, observations, and artifacts and then identify the event from this evidence. Finding evidence for leadership events before identifying the events themselves leads to the understanding of the emergence as a primary objective, the aim of this research. After receiving consent and obtaining a signed written copy interviews will be conducted at the interviewee's convenience. The interviews will not take longer than 30 minutes with a possible 10 minute follow up interview if necessary. I anticipate interviews taking place at the school or in local open spaces, for example on the park

benches behind the school, somewhere social distancing can be maintained and that conforms with local government guidelines regarding COVID-19. I will encourage interviewees to wear masks at all times and I will encourage the participant to hand sanitize before and after the interview. I will constantly review government guidelines to ensure that my interviews are within regulations set out by both the Federal and State legislators. I will record the interviews using my phone and then transcribe them using appropriate software. Face to face interviews will be recorded using the recording device called the "voice memos" app on an iPhone or iPad. Documentation, in the form of emails, sent to faculty and staff during lockdown, have been archived and as a current member of faculty I have access to these records. If during interviews participants identify that they sent administration communications during the lockdown I will request to see these emails. I will provide them with an email consent form during the interview. If they cannot find the actual email or they do not want to share directly with me then I will ask them to verbally explain their understanding of what they wrote in the email as a close facsimile.   I have saved the Facebook posts that referred to the school and the lockdown policy from a community Facebook page. The "Montgomery public schools - community board of education" is a private group with approximately 7.2K members; I am a member of this group and can therefore use the information in this forum (Franz et al., 2019).

13C. List all data collection instruments used in this project, in the order they appear in Appendix C.
   (e.g., surveys and questionnaires in the format that will be presented to participants, educational tests, data
   collection sheets, interview questions, audio/video taping methods etc.)

   The data instruments that will be used, in the format of this presentation for this study include (1) Semi-structured ethnographic interviews using the voice memo app on iPhone or iPad or using Auburn's teleconferencing ZOOM. (2) the interview protocol (3) analysis of personal observations in the form of a personal diary entries (4) analysis of archived documents such as emails to faculty and PowerPoint presentations and (5) analysis of emails provided by participants obtained using email consent form.

13D. Data analysis: Describe how data will be analyzed.

   Using the interviews and personal observations my main analytical technique will be to construct an understanding of the changes the interviewees are describing and then, using other data sources, I will try to build an understanding of the emergence of a leadership event within the bounds of my theoretical framework, showing the resonance of aggregates and the emergence of a leadership event alongside the roles of the traditional leadership play in the event. Pattern matching (Yin, 2003) associates the actions of the administration's encouragement to the conceptual framework of complexity leadership. it also follows the actions of the stakeholder and places the events into a framework which demonstrate emergence and the existence of a leadership event. The possible interactions between stakeholders discussing whether to write the email can also be fitted into the framework with pattern matching (Yin, 2003). Other data sources, outside of interviews, can confirm a decision and a policy change but, stakeholders who believe policy changed because of their intervention, are an example of an emergent leadership event in the same way as documented changes. My a priori themes for coding the data gathered will be based on the leadership functions developed by Hazy and Uhl-bein (2011,2015): Administrative, Generative, Community Building, Information Gathering, and Information Using.

13E. List any drugs, medications, supplements, or imaging agents that participants will ingest/ receive during participation in the study or indicate not applicable (N/A).

   N/A

14. Risks & Discomforts: List and describe all the risks participants may encounter in this research including risks from item 6d of this form, in this research. If deception will be part of the study, provide the rationale for the deception, describe the debriefing process, and attach a copy of the debriefing form that will be used as Appendix D. (Examples of possible risks are in section #6C)

The risks that participants might encounter in this study include (1) breach of confidentiality due to the use of identifiable information at collection. (2) There may be a psychological risk since (a) the administration and leadership positions may be uncomfortable with their decision-making process being analyzed after-the-fact or (b) parents may be uncomfortable with identifying any differences of opinion they had with the school and district administration and may be concerned about the risk of unprofessional retribution on their student. (3) coercion maybe a risk associated with this study since I am an eighth-grade science teacher at this school. (4) Exposure to CoVID-19 during the interview may be a risk.

15. Precautions / Minimization of Risks

15A. Identify and describe all precautions that will be taken to eliminate or reduce risks listed in items 6.c. and 14. If participants can be classified as a "vulnerable" population, describe additional safeguards that will be used to assure the ethical treatment of vulnerable individuals. **If applicable, submit a copy of any emergency plans/procedures and medical referral lists in Appendix D. (Sample documents can be found online at** https://cws.auburn.edu/OVPR/pm/compliance/irb/sampledocs **precautions)**

To eliminate and reduce the risks associated with a breach of confidentiality, pseudonyms will be used to replace names of participants. Other potentially identifiable information, such as students' names and students' classes given during interviews or in subsequent emails, will not be used during analysis or presentation of findings. The code list for real names will be kept separately in a secure locked desk in my office. Since the voice from the recordings are identifiable the audio data will be kept secure using Auburn's cloud storage BOX and deleted once the transcript is complete. To minimize any risk of discomfort participants will be reminded that they do not have to respond to any question that makes them feel uncomfortable and that participation is voluntary and that they can withdraw at any time. Before the interviews with administration will reinforce the positions that the decisions they made were taken at a time of crisis and they were made in good faith by professionals who took the pulse of the situation and acted accordingly. This is not a debate to decide if the leadership decisions can stand the test of time and formal analysis. There will be no jux-de-position of the on-the-spot decision making with Monday morning quarterbacking. To reduce the risks of coercion the participants will be reminded that (1) participation is voluntary and they may withdraw at any time during the study. Participants will also be reminded that (2) an individuals' decision, whether to participate or stop participating, will not jeopardize their future relationship with any of the administration or any member of faculty or staff, (3) Some participants will feel more comfortable with face to face interviews rather than using technology, for these cases there is a minimal risk of exposure to COVID due to human to human contact. To minimize these risks further interviews will take place where social distancing can be maintained. Local government guidelines regarding COVID 19 will be exercised. I will wear a mask and I will encourage participants to wear a mask at all times and I will encourage the participant to hand sanitize before and after the interview. There will be no physical contact between the interviewer and the participant (shaking hands etc). I will constantly review government guidelines to ensure that my interviews are within regulations set out by both the Federal and State legislators.

15B. If the Internet, mobile apps, or other electronic means will be used to collect data, describe confidentiality and/or security precautions that will be used to protect (or not collect) identifiable data? Include protections used during collection of data, transfer of data, and storage of data. If participant data may be obtained and/or stored by apps during the study, describe.

The computer storing information saved for the study will only be accessible with a secure password, identifiable information will be removed and replaced with pseudonyms to ensure confidentiality is maintained. Any emails provided by participants will be kept on a secure server using Auburn's cloud storage box. Original data with identifiable information will be destroyed, deleted or shredded, once information is collected and names are changed to pseudonyms.

Pseudonyms are necessary for matching archived data and interviews since I am examining patterns. Zoom interviews will only be recorded using audio. Once the transcription is complete the actual interviews will be deleted. In accordance with Auburn university guidelines I will remind participants to protect their privacy by making sure they are conducting interviews in a private space where they are comfortable that the conversion will not be overheard, and I will encourage participants to disable "cookies" and close their device's browser. I will inform participants how and where Zoom recordings are saved; I will be using the Zoom provided by Auburn University

15C. Additional Safeguards

Will DEXA, pQCT, or other devices which emit radiation be used? ☐ Yes ☒ No

If yes, the IRB will notify the Auburn Department of Risk Management and Safety, who will contact the Alabama Department of Public Health (ADPH) and secure approval for the research which includes device(s) which emit radiation may NOT be initiated NOR will IRB stamped consent documents be issued until the

IRB is notified of ADPH approval.

- Will a Certificate of Confidentiality (CoC) issued by NIH be obtained ☐ Yes ☒ No If yes, include CoC language in consent documents and include the documentation of CoC approval. Research which includes a CoC may not be initiated NOR will IRB stamped consent documents be issued until the IRB is notified of CoC approval. **AU Required CoC Language**

- Is the study a **clinical trial**? ☐ Yes ☒ No
   If yes, provide the National Clinical Trial (NCT) # Click or tap here to enter text. and include required clinical
      trial information in all consent documents. **AU Clinical Trial Information**

16. Benefits

16A. List all realistic direct benefits participants can expect by participating in this study. (Compensation is not a benefit) If participants will not directly benefit check here. ☐

While there are no direct benefits through this research participants may be able to see, and understand, a link between their interactions and communications, and the traditional leadership decision-making processes. They may become more empowered in the future to become more involved in organizational matters and more likely to express an opinion.

16B. List realistic benefits for the general population that may be generated from this study.

Realistic benefits while not generalizable may be transferable and include an increased understanding of everyday interactions and communications, and the influence these relationships have on traditional leadership decision-making processes

17. Protection of Data

17A. Data are collected:

☐ Anonymously with no direct or indirect coding, link, or awareness by key personnel of who participated in the study (skip to item E)

Confidentially, but without a link to participant's data to any identifying information (collected as "confidential" but recorded and analyzed "anonymous") (Skip to item E).

☒ Confidentially with collection and protection of linkages to identifiable information.

17B. If data are collected with identifiers and coded or as coded or linked to identifying information, describe the identifiers and how identifiers are linked to participants' data.

In one of my data sources (recorded zoom interviews) there will be two identifiers; the participants' names and the audio voice recording. The names will be changed to a pseudonym as the data is transfered. After transcription of the voice recording data it will be deleted immediately. The second data source that contains identifying features are personal emails which may contain two or more identifiers including names of sender, names of students involved and/or names of teachers or classes. Also email addresses are identifiable information. These will be changed to pseudonyms as the data is transfered, individuals' identities will also be protected by protecting the identity of the school and the school district. Montgomery public school district "does not allow researchers to mention Montgomery county schools by name, the name of the school, or names of teachers or other participants' "(Montgomery County Board of Education, Permission for Research).

Pseudonyms need to be used as I am studying community interactions and influences. The names need to be consistent throughout my data sources (1) interviews, (2) personal emails. This will then be linked to decision making data which has no personal identifiers.

17D. Describe how and where identifying data and/or code lists will be stored. (Building, room number, AU BOX?) **Describe how the location where data is stored will be secured. For electronic data, describe security measures. If applicable, describe where IRB-approved and participant signed consent documents will be kept on campus for 3 years after the study ends.**

The only way to link real names to participants would be access the code list, along side the participant signed documents and they will be kept in physically separated locations. The code list will be stored in my locked desk draw at home in Montgomery, Alabama. Once all the data is collected and are replaced with pseudonyms this code list will be destroyed by shredding and deleting the file. Files with pseudonyms will be saved using Auburn's cloud storage box. IRB approved, and participant signed consent documents will be kept in a sealed envelope on the campus of Auburn University (Auburn, Alabama) in Dr Hahn's office (Hailey center, room 4012) for three years after the study ends.

17E. Describe how and where data will be stored (e.g., hard copy, audio/ visual files, electronic data, etc.), and how the location where data is stored is separated from identifying data and will be secured. For electronic data, describe security. Note use of a flash drive or portable hard drive is not appropriate if identifiable data will be stored; rather, identifying participant data must be stored on secured servers.

All data from the interviews, including a hard copy of transcripts and hand written notes will be stored and kept in a locked desk draw in my home office in my absence. All files mentioned along with audio recordings from interviews will be stored electronically on computer and will be saved using Auburn's cloud storage BOX and kept on secure password protected laptop in a locked office at home in my absence.

17F. List the names of all who will have access to participants' data? (If a student PI, the faculty advisor must have full access and be able to produce study data in the case of a federal or institutional audit.)

17(f) Dr Ellen Hahn, faculty advisor, and Elizabeth Parker, principle investigator, have access to participants' data.

17G. When is the latest date that identifying information or links will be retained and how will that information or links be destroyed? (Check here if only anonymous data will be retained ☐)

All identifying information and links (coding list) will be retained until all data (from the interviews and the personal emails) is collected and will be deleted or shredded no later than December 31 2022, Audio recordings of interviews will be deleted once transcribed and checked for accuracy and transcripts will be shredded upon completion of analysis, no later that December 31 2022.

Version Date: 04/02/2022

AUBURN UNIVERSITY

(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS
IRB APPROVAL INFORMATION WITH CURRENT DATES
HAS BEEN ADDED TO THIS DOCUMENT.)

PARTICIPANT INFORMED CONSENT
for a Research Study entitled

"A Study Of Complex Leadership Theory In an American High School Community During The Covid-19 Outbreak of 2020".

Summary of this study: I am asking you to participate in a research study titled "A Study of Complex Leadership Theory in a Title One Middle School During the CoVID-19 Outbreak of 2020" I will describe this study to you and answer any questions that you may have. The research study is voluntary, meaning you do not have to take part in it. The purpose of this research is to explore the relationships between people in the community and understand how contributions people made through emails and conversations influenced the decision-making process of the school administration during lock down. The researcher's intent is to understand how complex influences impact decision making. You were selected as a possible participant in this research study because of your contribution to this process either through an email you wrote or a conversation you have said you had that may have influenced decision making; or through being in an administrative position in Montgomery Public School District during the lock down; also you are age 19 or over. There are minimal risks that include a breach of confidentiality and an exposure to COVID through human to human contact during an interview. The are no direct benefits to you participating in this study. The benefit to the researcher is to help with better understanding of complex leadership in schools. The alternative is that you do take part in this study.

What I will ask you to do: If you agree to participate in my research, I will conduct an interview with you at a time and location of your choice. if you want to conduct the interview using Zoom or meet face to face, I can facilitate either one of these options. I will ask you to talk to me about your feelings during the lock down with regards to the school administration and what you thought was important enough to let them know through email or conversations; or how you as an administrator reacted to the correspondences from the community. The interview will take no longer than twenty minutes, and is a chance for you to explore and discuss what happened during lock down. With your permission I will take notes and record the interview using only audio. The recording is needed to accurately record the information you provide; and will be used for transcription purposes only.

There are two ways we can conduct the interview either using Zoom or face to face. With either method if you agree to be recorded but then feel uncomfortable at any time during the interview, I can turn off the recording at your request. If you don't wish to continue you can stop the interview at any time. I expect to only conduct one interview, but a follow-up interview may be needed for clarification. If a follow up is needed I'll contact you within two weeks of the original interview. The follow-up should take no longer than ten minutes.

The Auburn University Institutional
Review Board has approved this
Document for use from
02/07/2022 to _____
Protocol # 21-549 EP 2202

Participant's Initials _____
Page 1 of 2

I may also ask to see the emails you sent to the administration, regarding lock down. If you consent I will download your email. To protect your confidentiality I will replace your name with a pseudonym, remove any identifying information and then delete the original email prior to conducting my analysis. the research will provide valuable information about how you communicated with your peers and administration and how you may have influenced the decision making process. You can talk to me in an interview and not consent to providing emails. Providing your emails will only take the time it takes for you to forward them to me.

Risks and discomforts: Breach of confidentiality is the risk associated with participating in this research study due to the use identifiable data. To minimize this risk, pseudonyms will be used once the transcripts are downloaded. The use of the electronic data sent via email presents no greater risk than everyday use of the Internet. If you feel more comfortable conducting the interview with me in person then there is a small risk of exposure to COVID virus from close human contact during the interview but I will ensure that all state and government protocols are followed during the interview including (but not limited to) social distancing; hand sanitation before and after the interview; and both parties wearing masks during the interview.

Benefits: If you participate in this study, you can expect no direct benefits. However, an indirect benefit is that information from this study may be used to benefit future decision-making processes during times of crisis. I cannot promise that you will receive the receive the benefit described.

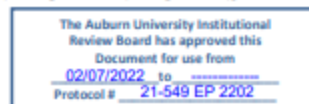**Compensation for your participation:** There will be no compensation offered.
Costs involved: There are no costs related to your participation in this study.

Privacy/ Confidentiality/ Data Security: Your privacy will be protected. Any data obtained in connection with this study will remain confidential. The researcher will use pseudonyms for all names and will not use any personally identifying information in the analysis or presentation. The findings of this research will be used to fulfill an educational requirement for a dissertation; and may also be used to create presentations or publications.

Taking part is voluntary and you may withdraw at any time during the study. You may refuse to participate before the study begins. Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, Department of Educational Foundation, Leadership, and Technology or those people involved in this study.

If you have questions: The main researcher conducting this study is Elizabeth Parker, doctoral candidate at Auburn University. Please ask any questions you have now. If you have questions later, you may contact eap0036@auburn.edu at eapo0036@gmail.com or at +39 348 031 1942 or the faculty advisor for this study, Ellen Hahn, Professor in the Auburn University Department of Educational Foundation, Leadership, and Technology at reamseh@auburn.edu. If you have questions regarding your rights as a subject in this study, you may contact the Auburn University Office of Research Compliance or the Institutional Review Board by phone (334)-844-5966 or e-mail at IRBadmin@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES YOUR WILLINGNESS TO PARTICIPATE.

> The Auburn University Institutional
> Review Board has approved this
> Document for use from
> 02/07/2022 to _____
> Protocol # 21-549 EP 2202

Email Consent	**Interview Consent**	**Investigator Obtaining Consent**
_____	_____	_____
Participant's signature/ Date	Participant's signature/ Date	Investigator's signature/ Date
_____	_____	_____
Printed Name	Printed Name	Printed Name

Page 2 of 2

Facebook Advertisement
(Include the purpose, inclusion criteria, contact info)

PARTICIPATE IN A RESEARCH STUDY
If you are a parent of a student at Goodwyn MIddles school and you wrote an email to the principal or the district superintendent during lock down (23rd February – 10th June 2020) about the way the virtual school was being run I would like to hear from you. If you privately emailed the administration with your concerns or your comments, I would also love to hear from you. Participants in my research will be interviewed and will help contribute to PhD research about community influences on leadership in crisis. Pseudonyms and data protection will be employed. If you are interested, please PM me, Elizabeth Parker, through this post or email me at eap0036@auburn.edu

Version Date (date document created): _____

178

VIA EMAIL
Elizabeth Parker
110 Saccapatoy Drive
Montgomery, AL 36117

RE: Permission for Research

October 8, 2021

Dear Ms. Parker,

I have reviewed your request to complete research at Goodwyn Middle School for your PhD in Educational Leadership.   Because you are employed at Goodwyn Middle School, you must remember that your research study cannot be conducted during your instructional time or any other participant's instructional time.

 Please remember that you are not to mention Montgomery County Public Schools by name, the name of the school, or names of the teachers or any other participant in your dissertation/research study. Participation by staff and others must be voluntary. At the conclusion of this project, it is understood that the documents used in this project will be properly destroyed.

We reserve the right to withdraw from the study at any time if circumstances change or guidelines are not followed. If you have any questions regarding this letter of approval, please give me a call at 334-223-6730.

Sincerely,

Kim L. Gillis
Associate Superintendent

Name	Elizabeth Parker (ID: 7183353)
Institution	Auburn University (ID: 964)
Course	IRB # 2 Social and Behavioral Emphasis - AU Personnel
	Research in Public Elementary and Secondary Schools - SBE
	Research with Children - SBE
	Social, Behavioral and Education Sciences RCR
Stage	Stage 1 - Basic Course
Completion Date:	22-Oct - 2021
Expiration Date	21- Oct 2024
Record ID	41081793

https://www.citiprogram.org/verify/?w23e2f56a-d17b-4bf6-be21-d0f1e834dd04-41081793

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Ellen Hahn (ID: 944893)
- **Institution Affiliation:** Auburn University (ID: 964)
- **Institution Email:** reamseh@auburn.edu
- **Institution Unit:** efit
- **Phone:** 7065737563

- **Curriculum Group:** Responsible Conduct of Research for Social and Behavioral
- **Course Learner Group:** Social, Behavioral and Education Sciences RCR
- **Stage:** Stage 2 - RCR Refresher
- **Description:** This course is for investigators, staff and students with an interest or focus in **Social and Behavioral** research. This course contains text, embedded case studies AND quizzes.

- **Record ID:** 45348324
- **Completion Date:** 30-Jan-2022
- **Expiration Date:** 29-Jan-2027
- **Minimum Passing:** 80
- **Reported Score*:** 98

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Authorship (RCR-Refresher) (ID: 15661)	30-Jan-2022	5/5 (100%)
Collaborative Research (RCR-Refresher) (ID: 15662)	30-Jan-2022	5/5 (100%)
Conflicts of Interest (RCR-Refresher) (ID: 15663)	30-Jan-2022	4/5 (80%)
Data Management (RCR-Refresher) (ID: 15664)	30-Jan-2022	5/5 (100%)
Peer Review (RCR-Refresher) (ID: 15665)	30-Jan-2022	5/5 (100%)
Research Misconduct (RCR-Refresher) (ID: 15666)	30-Jan-2022	5/5 (100%)
Mentoring (RCR-Refresher) (ID: 15667)	30-Jan-2022	5/5 (100%)
Research Involving Human Subjects (RCR-Refresher) (ID: 15668)	30-Jan-2022	5/5 (100%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?ke342d07c-074e-454d-a1dc-79fd93d8743b-45348324

Collaborative Institutional Training Initiative (CITI Program)
Email: support@citiprogram.org
Phone: 888-529-5929
Web: https://www.citiprogram.org

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Ellen Hahn (ID: 944893)
- **Institution Affiliation:** Auburn University (ID: 964)
- **Institution Email:** reamseh@auburn.edu
- **Institution Unit:** efit
- **Phone:** 7065737563

- **Curriculum Group:** Responsible Conduct of Research for Social and Behavioral
- **Course Learner Group:** Social, Behavioral and Education Sciences RCR
- **Stage:** Stage 2 - RCR Refresher
- **Description:** This course is for investigators, staff and students with an interest or focus in **Social and Behavioral** research. This course contains text, embedded case studies AND quizzes.

- **Record ID:** 45348324
- **Report Date:** 30-Jan-2022
- **Current Score**:** 98

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
Authorship (RCR-Refresher) (ID: 15661)	30-Jan-2022	5/5 (100%)
Collaborative Research (RCR-Refresher) (ID: 15662)	30-Jan-2022	5/5 (100%)
Research Involving Human Subjects (RCR-Refresher) (ID: 15668)	30-Jan-2022	5/5 (100%)
Conflicts of Interest (RCR-Refresher) (ID: 15663)	30-Jan-2022	4/5 (80%)
Data Management (RCR-Refresher) (ID: 15664)	30-Jan-2022	5/5 (100%)
Peer Review (RCR-Refresher) (ID: 15665)	30-Jan-2022	5/5 (100%)
Research Misconduct (RCR-Refresher) (ID: 15666)	30-Jan-2022	5/5 (100%)
Mentoring (RCR-Refresher) (ID: 15667)	30-Jan-2022	5/5 (100%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?ke342d07c-074e-454d-a1dc-79fd93d8743b-45348324

Collaborative Institutional Training Initiative (CITI Program)
Email: support@citiprogram.org
Phone: 888-529-5929
Web: https://www.citiprogram.org

CITI PROGRAM

Completion Date 30-Jan-2022
Expiration Date 29-Jan-2025
Record ID 48419807

This is to certify that:

Ellen Hahn

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

IRB Additional Modules
(Curriculum Group)
Research in Public Elementary and Secondary Schools - SBE
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

Auburn University

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w68c8bfb7-704b-41eb-8c8f-1d73bbf2340c-48419807

CITI PROGRAM

Completion Date 30-Jan-2022
Expiration Date 29-Jan-2025
Record ID 48419823

This is to certify that:

Ellen Hahn

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

IRB # 2 Social and Behavioral Emphasis - AU Personnel - Basic/Refresher
(Curriculum Group)
IRB # 2 Social and Behavioral Emphasis - AU Personnel
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

Auburn University

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w52f24c75-b9be-4ac1-a3f3-77aea434f971-48419823

CITI PROGRAM

Completion Date 30-Jan-2022
Expiration Date 29-Jan-2027
Record ID 45348324

This is to certify that:

Ellen Hahn

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

Responsible Conduct of Research for Social and Behavioral
(Curriculum Group)
Social, Behavioral and Education Sciences RCR
(Course Learner Group)
2 - RCR Refresher
(Stage)

Under requirements set by:

Auburn University

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?wcbddc4a4-b34f-4ec0-aa87-8c144754b1e6-45348324