

COMPLEX SYSTEMS THEORY AND SCHOOL IMPROVEMENT FOR
PRACTITIONERS: A PARTICIPATORY ACTION RESEARCH

A Dissertation

Presented in Partial Fulfillment of the Requirements for the

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With a

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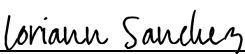
Cassie Ridenour

April 5, 2023

Major Professor: John Miller, Ed.D.

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This dissertation of Cassandra Ridenour, submitted for the degree of Doctor of Education with a major in Educational Leadership and titled “Complex Systems Theory and School Improvement for Practitioners: A Participatory Action Research,” has been reviewed in final form. Permission, as indicated by the signatures and dates given below, is now granted to submit final copies.

Major Professor	<div>DocuSigned by:  69757AF90AED42A...</div> <div>Dr. John Miller</div>	Date <u>4/5/2023</u> 13:13:36 PDT
Committee Members	<div>DocuSigned by:  F8348EEFFA804B7...</div> <div>Dr. Darik Williams</div>	Date <u>4/5/2023</u> 14:40:12 PDT
	<div>DocuSigned by:  5A7B5D2C3B8D44B...</div> <div>Dr. Steve Leifsen</div>	Date <u>4/5/2023</u> 15:26:25 PDT
Doctoral Program Director	<div>DocuSigned by:  18C507285A124B4...</div> <div>Dr. Heidi Curtis</div>	Date <u>4/6/2023</u> 08:22:05 MDT
Discipline's College Dean	<div>DocuSigned by:  1F6287564ACC4DC...</div> <div>Dr. LoriAnn Sanchez</div>	Date <u>4/6/2023</u> 09:00:03 MDT

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Metacognitively, I know that acknowledgments are the first thing skipped in a paper of this length (I know this, because I do this), but I also know that it is important to recognize the journey that is a doctoral endeavor and the people who have been significant guides along the way. As such, consider this my opportunity to thank 20 years' worth of people who challenged a privileged, insulated young adult to step out of their comfort zone, recognize inequities, and utilize their privilege to work towards changing systems of injustice, in this case, unjust systems ingrained in our processes of educating our future.

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DEDICATION

Dedicated to my dog, Ellie, who kept my feet warm and only bothered me with heavy sighs of abandonment every 10 minutes or so.

ABSTRACT

School reform efforts, though the subject of a great deal of scrutiny and research since the publication of *A Nation at Risk* in 1983, have resulted in negligible positive net results for student achievement on any of our current scales of measurement. Additionally, our current school system has yet to fully or successfully pivot to a twenty-first century school model that meets the changing needs of our students or economy. The participatory action research presented here applies a complex systems theory lens to the school improvement process, particularly in Washington State but with broader applications, in order to determine the effects on the individual and collective efficacy on a group of educational leaders. The data collected indicate that the process utilized to research and the theoretical framework of complex systems theory both result in a more holistic approach to school improvement that increased the individual and collective efficacy of the educational leaders who participated in the research process. Because efficacy is a research-based critical component of school reform efforts, this complex systems theory approach to school reform is a potential model for school improvement efforts given continued field research to confirm the findings presented here.

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Chapter I

Introduction

If leaders in a school have a tool to assess the health of their school system which applies a complex systems lens, their efforts at reform could, in theory, have a more sustained and transformative effect on student achievement than some of the more conventional school reform efforts of the past four decades. The most basic intent of school reform is to increase student achievement, and reform has been the subject of regular research, examination, and experimentation, yet little consistent improvement is found throughout the American education system by any standard measurement systems (Gutierrez & Waitoller, 2017; Kelly, 2008; Lehman, 2015; NCES, 2019a; NCES 2019b). In 2011, Arne Duncan testified that the Department of Education had determined 40 percent of American schools were not meeting the goals set by the No Child Left Behind Act (NCLB) and that it anticipated 80 percent would not be reaching those goals by the following year (Winning the future, 2011). Despite both that administration's Department of Education and its successor's passing educational reform legislation meant to address the gap between intent and outcome, The National Assessment of Education Progress (NCES, 2019a; NCES, 2019b) most recently found that student scores for math and reading in the 4th and 8th grade were lower than scores from 2017 and scores for 12th graders were statistically the same in mathematics and statistically lower in reading compared to the 2015 scores. Looking at even longer-term trends, the 2012 NAEP report found modest gains in reading and math among nine- and 13-year-olds in comparison to data from 1971, but no gains among 17-year-olds (NCES, 2013).

These lackluster data are the end results of forty years of continuous reform efforts legislated at the federal level, enacted by each successive presidential administration, and

implemented by states through either federal funding incentives or punishments in a cycle of reform initiated by the Reagan administration's report on education *A Nation at Risk* (Dupre, 2018; Lehman, 2015; Lenhoff & Ulmer, 2016; Young, 2018). The report warned that the very foundations of American economic and democratic exceptionalism were being threatened by a "rising tide of mediocrity that threatens our very future as a Nation and a people" (United States, 1983, p. 9). This existential threat to American exceptionalism set the precedent for each new presidential administration which followed to press for school reform measures, each new effort seeking to measure and achieve excellence for every American student (Dupre, 2018; Lehman, 2015; Lenhoff & Ulmer, 2016; Young, 2018). Regardless of which political party has been in control of these reforms, they generally followed the mold of neoliberal educational reforms: a push for privatization, whether individual systems (such as custodial, food service, or curricular materials) or entire schools (i.e., charter schools in place of publicly run schools), and rigorous accountability to standardized achievement assessments in order to assess the success and value of an individual school or, in some cases, teacher (Boll, 2018; Dupre, 2018; Gutierrez & Waitoller, 2017; Lubienski, 2017). Yet all these efforts, from Reagan's initial call to action to Obama's Every Student Succeeds Act, have resulted in neutral or negative student academic achievement (Dee & Dizon-Ross, 2019; NCES, 2019a; NCES, 2019b). Scholars attribute this lack of systemic improvement, despite on-going and consistent efforts at reform, to three potential causes: inadequate definitions of student achievement and assessment tools, an outdated approach to education based on an antiquated economic model, and a lack of a whole-systems approach to reform.

Some research indicates the solution to persistent challenges in school reform is in exploring a new definition of student success and examining new indicators of achievement in

school systems (Bae, 2018; Gutierrez & Waitoller, 2017; Klein, 2018; Kunkel, 2016). One study interviewed graduates of a school modeled on developmental psychologist Howard Gardner's research of multiple intelligences and focused on student-centered, experiential learning; the majority of students indicated standardized test scores were not important to either the colleges they attended or their later success in life; it was the focus on project-based learning and leadership development in the curriculum they experienced that graduates credited with their later success in life (Kunkel, 2016). Similarly, a study of Montessori education, another alternative to more traditional public-school models, found that the pairing of both academic and social/emotional development led to higher student achievement for Montessori students than their public school peers (Lillard, 2019). Critics of neoliberal reform efforts suggest that the low student achievement scores found in both public and charter schools are not the only indicators of the failure of that style of reform; analysis should also consider the effects of reform on student mental health, engagement, the climate and culture of the school, as well as the social justice impact on marginalized communities, especially racial minority, homeless, and special education populations that are frequently disproportionately impacted by the privatization or corporatization of schools (Dupre, 2018; Gutierrez & Waitoller, 2017; Lubienski, 2017). The pivot in the Every Student Succeeds Act from a single high stakes test measurement of student success to multiple measures of student success (Bae, 2018; Klein, 2018) indicates some legislative acknowledgement of the complexity of defining student success.

Other research locates the difficulty in achieving positive school reform in an outdated model of education which no longer meets the needs of our present economic and social reality (Duffy, 2008; Johnson, 2018; Kereluik et al., 2013; Soulé & Warrick, 2015). Research in this area suggests schools are failing because they were designed in the Industrial Age and

predominantly sort students into groups of workers which no longer exist (or less so) in the current Information Age (Duffy, 2008; Johnson, 2018; Kereluik et al., 2013; Soulé & Warrick, 2015). In an Information Age school system, teaching would be learner-centered, flexible, and individualized rather than the current, generally, one-size-fits-most model of education (Aslan & Reigeluth, 2013; Choi et al., 2020; Johnson, 2018). Building on the work of Gardner and others, researchers and school reform organizations have put forth the need to transition schools to a 21st century skills curriculum focused on preparing students to engage in the economy both digitally and collaboratively with life skills, emotional awareness, and cultural competence (Johnson, 2018; Kereluik et al., 2013; Little, 2013; McPhail, 2016; Soule' & Warrick, 2015).

Still other research locates the problems of school reform and student achievement in the traditionally piecemeal and siloed efforts at reform rather than viewing schools as complex systems and approaching reform with a systems, complexity, or complex systems framework (Bryk, 2010; Clauset & Gaynor, 1982; Crick et al., 2017; Duffy, 2008; Jacobson et al., 2016; Kelly, 2008; Kershner & McQuillan, 2016; Mania-Singer, 2017; Morrison, 2008; Thornton et al., 2007). Research has demonstrated that systems analysis and complexity theory can effectively model, account for, and sustain real educational change rather than producing the more frequent temporary or compartmentalized positive effects of other kinds of reform efforts (Clauset & Gaynor, 1982; Crick et al., 2017; Duffy, 2008; Jacobson et al., 2016; Kelly, 2008; Kershner & McQuillan, 2016; Stamovlasis, 2014). Building on the theory that schools are complex systems, Duffy (2008) insists reform efforts fail when they do not address the entire system. Furthermore, an extensive Chicago study identified five key systems, whose both presence and positive relationship to each other were requisite, which reliably indicate a school's ability to reform for student success: a coherent instructional guidance system, professional capacity, strong parent-

community-school ties, student-centered learning climate, and leadership that drives change (Bryk, 2010). Each of these five components have been examined individually and extensively in educational research (addressed in Chapter 2) and found to be individually important to school reform and student achievement. Building on the understanding that these five systems are significant individually, the work presented here will build on Bryk's research and view them through a complexity and systems lens as interconnected and mutually essential.

Statement of the Problem

Researchers have made great strides in identifying critical systems for school reform and student success (Bae, 2018; Bryk, 2010; Choi et al., 2020; Kelly, 2008; Kunkel, 2016; Mania-Singer, 2017; Robinson et al., 2008). Bryk's (2010) study, mentioned above, identified five key systems critical for school reform and addressed ways in which those systems interact with each other. Coherent instructional guidance system has been examined by researchers in several different lenses, both in terms of the impact of access to materials and in terms of access to quality curriculum (Bryk, 2010; Edessa, 2017; Ellili-Cherif & Habda, 2017; Jacobson et al., 2016). Professional capacity, although a currently shifting target (Biesta, 2015; Kunter et al., 2013; Murray, 2014; Previts et al., 2013; Rimmer & Floyd, 2020; Torres & Weiner, 2018), is also a subject of research regarding its impact on student achievement (Bryk, 2010; Dueppen & Hughes, 2018; Lee & Chiu, 2017; Robinson et al., 2008). Strong community-family-school ties are not strongly examined in research (Latunde, 2017; Mette et al., 2019), but family-school ties are frequently found to be of significant importance to student achievement (Hall, 202; Kyzar & Jimerson, 2018; Lohmann et al., 2018; Smith et al., 2019). A student-centered climate is frequently examined, both through a lens on discipline (Borda et al., 2018; Buckmaster, 2016; Foggett et al., 2017; Hatton, 2013) and on a shift to 21st century and project-based curricula

(Bara & Xhomara, 2020; Kereluik et al., 2013; Kunkel, 2016; Little, 2013; McPhail, 2016; Saarinen et al., 2020; Soulé & Warrick, 2015; Üzüim & Pesen, 2019). Finally, strong leadership in a school setting is the frequent subject of research (Aidman & Long, 2017; Brown, 2016; Bryk, 2010; Kershner & McQuillan, 2016; Thornton et al., 2007). Few studies, however, examine more than one system at a time; most, instead, limit their focus to the impact of one system on a measurement of student achievement. Bryk's (2010) study is one of the few, comprehensive and extensive, studies that examined multiple systems within schools and established a clear interconnectedness among them.

Bryk's study, however, ended at establishing a connection among the systems and did not proceed to suggest how those systems and their connections could be monitored. Some researchers are working to develop data analysis tools and dashboards that can provide analysis of the data regarding multiple systems after the fact (Anthony et al., 2013; Crick et al., 2017; Stamovlasis, 2014; Thornton et al., 2007). The Wallace Foundation has marketed Balanced Scorecard, originally a business tool, as a tool which assesses multiple data points in order to plan for future performance (Kaplan & Miyake, 2010; Karathanos & Karathanos, 2005). While Balanced Scorecard looks at the interactions among key systems that it has identified, because of its shift away from academic factors and toward fiscal and stakeholder accountability to strategy implementation, it has, primarily, found a market in higher education rather than the public school sector (Beard, 2009; Camilleri, 2021; Reda, 2017). One notable exception to this is the Atlanta School District which credited its turnaround success on state assessments and other measures from 2008 to 2010 to its adoption of Balanced Scorecard as an accountability tool (Kaplan & Miyake, 2010). Unfortunately, investigation by journalists and federal agencies revealed that there was widespread cheating on state assessments during that time period in the

Atlanta School District (Fantz, 2015; Staff Report, 2015), so it is difficult to determine if the growth in achievement was real, manufactured, or in any way attributable to their use of Balanced Scorecard for district strategic planning and accountability. While Balanced Scorecard is one potential option for leaders looking for a tool to analyze their school from a systems lens, the systems it has chosen to assess do not coincide with the systems identified by educational research as key systems for school reform. So, while trusted leadership is repeatedly identified as a key factor in transformative change (Duffy, 2008; Kelly, 2008; Kershner & McQuillan, 2016; Robinson et al., 2008; Thornton et al., 2007), the current literature does not seem to provide an adequate complex systems lens tool which has been vetted for leaders to use in making change decisions.

In addition to these concerns, teacher efficacy has been established repeatedly as a critical component of student achievement (Hattie, 2017; Lazarides et al., 2022; Tschannen-Moran & Barr, 2004). For the purposes of this research, the concern with efficacy is expanded from just teacher efficacy to the efficacy of any who serve in the capacity of leadership in the school. If complex systems theory is a viable model for understanding schools and reform and the stated outcome of school reform is improved student outcome, then the role of school leader efficacy cannot be ignored in the process of school reform.

The problem prevalent in current research is that school reform efforts frequently focus on discrete results rather than holistic results and are fragmented rather than systemic (Bae, 2018; Bryk, 2010; Clauset & Gaynor, 1982; Crick et al., 2017; Duffy, 2008; Johnson, 2018; Kelly, 2008; Mania-Singer, 2017; Stamovlasis, 2014; Thornton et al., 2007), but the literature indicates that few practical solutions to this problem have been suggested or researched. The purpose of this study is to propose an approach to school reform which utilizes a complex

systems theory framework in order to expand the definition of school leader, to impact the self-efficacy of school leaders with regards to school reform, and, thereby, achieve long-term, sustainable transformative change.

Background

In Washington State, schools operate under local control of community school boards and the locus of change in many individual school sites is the comprehensive school improvement plan (CSIP) committee or similar body. WAC 180-16-220 requires that every school submit an annual improvement plan in order to be a recognized public school in the state (Supplemental basic education program approval requirements, §2b). The CSIP committee, generally chaired by the school principal, is responsible for producing this annual improvement plan in most schools. While an optional form is provided to school sites which asks guiding questions about student performance and the school's vision (School Improvement Resources, n.d.), it does not provide a tool to assess the critical systems in a school or how the systems interact with each other to guide the school's decision-making. Without an accurate measurement of the current state of the systems, all goals are written based on post-hoc data and largely standards-referenced assessments, rather than on an up-to-date analysis of whether or not the systems are serving the needs of the students. Additionally, by limiting the work of school reform to a small, designated group, the self-efficacy of other school leaders with regards to school improvement is impacted negatively. If a complex systems framework is applied to both the definition of school leader and the creation of a school assessment, these committees could potentially have a more positive and sustained impact on an individual school's reform efforts to address the 21st century need of their students.

Research Questions

The current study will apply a complex systems theory framework and a participatory action research model in order to answer the questions:

1. How does a complex systems framework alter a school leadership group's understanding of their school as a locus of reform?
2. How does collaboratively developing a complex systems assessment tool affect the self-efficacy of a school leadership group with regards to transformative school reform?
3. How does using a complex systems assessment tool to evaluate their school environment affect the self-efficacy of a school leadership group with regards to transformative school reform?
4. How does using a complex systems assessment tool to set transformative school goals affect the self-efficacy of a school leadership group with regards to transformative school reform?

Description of Terms

Coherent instructional guidance system. The components of instructional delivery, including curriculum, physical setting, physical supplies, and the experience of the teacher; one of five essential systems in transformative change (Bryk, 2010).

Complex adaptive systems. Nonlinear structures composed of multiple systems that adapt organically based on internal and external pressures (Kershner & McQuillan, 2016; Kloos et al., 2019).

Complex systems theory. The application of the understanding of, in this case, schools and education as comprised of multiple, inter-related, complex systems which are subject to the

rules of both systems (such as internal and external influence and feedback loops) and complexity (such as emergence and adaptation), the recognition of which will affect approaches to reform (Jacobson et al., 2016; Morrison, 2008).

Complexity theory. The theory that systems do not simply function on an input -> process -> output model, but functions such as feedback, emergence, disequilibrium, and adaptation are natural components of interacting systems (Mason, 2008a; Mason, 2008b; Stamovlasis, 2014; White & Levin, 2016).

Disequilibrium. A critical feature of complexity theory that recognizes that systems frequently exist out of balance; too much disequilibrium is chaotic, too little is stagnant, just enough is an opportunity for change (Anthony et al., 2013; Jacobson et al., 2016; Kershner & McQuillan, 2016; Kloos et al., 2019; Mason, 2008a; Mason, 2008b; Morrison, 2008; Radford, 2008; White & Levin, 2016; Wood & Butt, 2014).

Feedback loop. System, complexity, and complex systems theory all utilize the concept of feedback loops, the idea that an input causes a particular output. Positive feedback loops escalate output while negative feedback loops de-escalate output (Clauset & Gaynor, 1982; Jacobson et al., 2016; Thornton et al., 2007; White & Levin, 2016; Wood & Butt, 2014).

Leadership that drives change. School leadership focused on transformative change rather than management of the status quo; one of five essential systems in transformative change (Bryk, 2010).

Neoliberal reform. Any reform effort focused on the reduction of governmental influence on education through the increased privatization of schools and school systems (Gutierrez & Waitoller, 2017; Lenhoff & Ulmer, 2016; Lubienski, 2017; Ross, 2020).

Parent-community-school ties. Purposeful connections among the essential community stakeholders in a school environment; one of five essential systems in transformative change (Bryk, 2010).

Participatory action research. A method of research in which the researcher is both apart from and a part of the field research. The explicit goal of participatory action research is to enact change in a community, a system, or a process which no longer meets the needs of its constituents, especially the marginalized members of its group (Creswell & Guetterman, 2019; Marshall & Rossman, 2016).

Professional capacity. The capacity of the teachers in a school to navigate the instructional guidance system; one of five essential systems in transformative change (Bryk, 2010).

Purposeful perturbations. The idea in complexity theory that outside agents can leverage disequilibrium within systems in order to cause feedback loops that will lead to emergence or adaptations of systems that will create lasting reform (Stamovlasis, 2014; White & Levin, 2016; Wood & Butt, 2014).

Self-efficacy. The belief that one's own efforts can impact individual and collective student outcomes regardless of outside influences (Lazarides et al., 2022; Skaalvik & Skaalvik, 2007; Tschannen-Moran & Barr, 2004).

Self-organization. The component of complexity theory that theorizes that systems that are in a state of disequilibrium seek stability through emergence and adaptation leading to organic self-organization of new or altered structures; the idea that systems can create their own solutions, either independently or purposeful prompting, when out of balance (Mason, 2008b; Stamovlasis, 2014; White & Levin, 2016; Wood & Butt, 2014).

Social justice. The promotion of equity for traditionally marginalized communities through systemic and systematic change (Cartabuke et al., 2019; Dorime', 2018; Niño & Perez-Diaz, 2021).

Student-centered learning climate. A school environment that, at the least, provides a safe setting for students to learn and, at best, centers instruction around student needs and interests rather than a rigid curriculum; one of five essential systems in transformative change (Bryk, 2010).

Systems theory. The application of biological and social sciences in order to understand schools as increasingly complex mechanisms of input -> process -> output which are influenced externally by their environment and internally by feedback loops (Clauzet & Gaynor, 1982; Duffy, 2008; Stowell & Welch, 2012; Thornton et al., 2007).

Overview of Research Methods

In examining methodologies to use in answering these research questions, intended outcome was considered heavily. Taking into consideration the critique that the last four decades of neoliberal reforms have largely ignored the social justice component of educational reform (Dupre, 2018; Gutierrez & Waitoller, 2017; Lubienski, 2017), as well as the fact that one of the stated outcomes of the research is to affect change in the research environment, participatory action research was chosen as the methodology for this research because of its explicit social impact and change as intended outcomes (Creswell & Guetterman, 2019; Marshall & Rossman, 2016). In participatory action research, researcher bias is always a risk due to both the explicit intention to affect change in the research site and because, frequently, it is carried out in a location that is within the researcher's usual locus of activity or control (Marshall & Rossman, 2016). In this instance, the latter possibility of researcher bias was mitigated by

completing the research in a school outside of the researcher's usual workplace where they had no regular, day-to-day interactions or authority. The researcher, did, however, embed themselves as a participant in the research during the first phase of the research, as outlined below. The first area of researcher bias was not controlled for as explicitly since the stated outcome of the research was to investigate if teacher efficacy could be affected by explicitly altering the method of school improvement practices utilized at the site, however, in choosing a school site, one was selected which already had explicitly and publicly stated that they were working toward school reform and whose leader has publicly demonstrated a reform stance.

In order to answer the first research question, the researcher embedded themselves as an outside provider of professional development to a team of school leaders which consisted of 5 teacher-leaders in a range of subject areas with varying degrees of experience and 1 paraeducator who serves as a classroom aide. In a 4-hour learning session approximately 1 week before the start of a school year, the leadership team learned about systems theory, complexity theory, and the five critical school systems established by Bryk's (2010) research and confirmed in studies about the individual systems (see Chapter 2). Based on that learning, the leadership team met independent of the researcher over the course of a month and wrote a set of descriptive rubrics to assess each system both internally and in reference to each other using a 4-point scale (needs improvement, basic, proficient, and distinguished) and provided descriptors of critical components of each level and examples of evidence to be examined. These two steps in the research process were designed to address the first two research questions.

To investigate the third research question, the leadership team then assessed the school site, using the rubrics. To answer the final research question, the team then used the completed rubrics to write school goals. Throughout this process, the researcher implemented a pre- and

post-survey regarding complex-systems theory, collected field notes, collected historical reference artifacts regarding past school improvement processes, and completed interviews with the participants. The interviews asked participants questions regarding their experience of the process, including about writing and completing the rubrics, their impressions of their usability, whether the rubrics gave a more or less complete picture of the school than their usual process, and if they felt the process resulted in more actionable goals than their usual process. Questions of self-efficacy were also explored in the interviews through questions addressing their general experience of the process while avoiding any questions which directly prompted thoughts on self-efficacy in order to avoid researcher bias in the responses.

Significance of the Study

While the research here is limited by scope, the intent is to demonstrate the feasibility of a complex systems lens as a viable framework for developing a tool for school practitioners and to lay the groundwork for further research into replicability and validation of tools. The results of the research indicate that school leaders who approach reform work with a complex systems theory lens create more holistic transformative school goals with practical application and viability in their setting while increasing the self-efficacy and sense of individual responsibility for reform in the participating school leaders. The particular tool developed in this research is unique to the study site, however, the resulting useability of both the professional development model and the tool developed by the practitioners suggests that, with additional field work and rubric samples, a more universal tool could be developed so that the work of school stakeholders could account for the complexity of schools as unique and organic systems as they seek to reform their schools for the sake of student achievement. Similarly, this research has established participatory action research as a credible methodology for additional research and

field work in development of a complex systems tool for educational practitioners to use in school reform efforts. While this phase of the work was and is slow, as more research on this model is completed and more field sites are added to the body of research established here, the eventual end result could be a tool that groups working toward school improvement will be able to use regardless of the particular features of their school site to establish viable transformational school improvement goals while also increasing the self-efficacy of individual school leaders with regards to their role in school reform. Such a tool, developed by practitioner researchers embedded in school communities rather than adapted and adopted from other fields such as business, could potentially allow educational practitioners to address the achievement and opportunity gaps identified in *A Nation at Risk* and transition to a student-centered twenty-first century educational system.

Chapter II

Review of Literature

The past decades of school reform have resulted in little advancement in either student achievement (Winning the future, 2011; NCES, 2019a; NCES, 2019b) or school structures (Aslan & Reigeluth, 2013; Choi et al., 2020; Johnson, 2018; Kereluik et al., 2013; Little, 2013; McPhail, 2016; Soule' & Warrick, 2015). In most cases, reform efforts tend to be siloed, focused on one component of education rather than the whole system, and fail to result in transformative change (Bae, 2018; Bryk, 2010; Clauset & Gaynor, 1982; Crick et al., 2017; Duffy, 2008; Johnson, 2018; Kelly, 2008; Mania-Singer, 2017; Stamovlasis, 2014; Thornton et al., 2007). Systems theory and complexity theory could provide a solid theoretical framework to approach the analysis of schools as interconnected systems, to improve school reform efforts, and to implement transformative change efforts (Duffy, 2008; Kelly, 2008; Kloos et al., 2019; Mason, 2008a).

This literature review will survey the origins and general concepts of systems theory and its application in educational research. This framework will support the addition of complexity theory and the understanding of schools as complex adaptive systems. Additionally, because of the complex and embedded nature of participatory action research (PAR) as a methodology, PAR will be considered as a third component of the theoretical framework for this research as well as serving as the methodology applied. It is through the lens of systems theory and complexity theory that historical and contemporary school reform efforts will be critiqued concluding in the need to reframe twenty-first century school reform through a holistic complex systems lens that addresses, at minimum, five critical school systems (instructional guidance system, professional capacity, parent-community-school ties, student-centered climate, and

leadership) in order to affect transformational change and student growth. Finally, the need for continuous school improvement, supported by access to multiple measures beyond the historical standardized test measurements, is examined through a complex systems lens.

Theoretical Framework

Maxwell (2013) and Marshall and Rossman (2016) emphasize the importance of acknowledging the lens through which research is being examined. By placing research in a framework, positionality is acknowledged, limitations can be accounted for, and new research can build on an established field (Marshall & Rossman, 2016; Maxwell, 2013). For the purposes of this study, two interrelated fields will serve as the primary theoretical framework for the research, systems theory and complexity theory, and, because of the complexity and embedded nature of the methodology, participatory action research will complete the framework for understanding this research.

Systems Theory

Systems theory grows out of the social and biological sciences but has provided meaningful insight in technology, business, and other fields. Systems theory relies on several foundational understandings, including boundaries, environment, interrelatedness, feedback loops, and increasingly complex input-process-output modeling (Clauzet & Gaynor, 1982; Crick et al., 2017; Duffy, 2008; Jacobson et al., 2016; Kelly, 2008; Mania-Singer, 2017; Stowell & Welch, 2012; Thornton et al., 2007). One of the clearest examples of systems theory in application is biology's understanding of ecosystems. Ecosystems have defined boundaries, sometimes stark, sometimes delimited by transition zones between systems, an environment in which it operates, a variety of living species connected through predator-prey or symbiotic relationships, and feedback loops that help the ecosystem to self-regulate (Anthony et al., 2013;

Mania-Singer, 2017; Stowell & Welch, 2012; Thornton et al., 2007). Social sciences, such as anthropology and sociology, apply similar modeling to human interactions with their environment and each other (Anthony et al., 2013; Mania-Singer, 2017). From that work, additional fields of study have found systems at work and working on each other within human constructs, including business, government, and education (Clauset & Gaynor, 1982; Duffy, 2008; Kelly, 2008; Mania-Singer, 2017; Stowell & Welch, 2012; Thornton et al., 2007).

Defining what is within the boundary of the system being examined versus what is in its environment is important for limiting the scope of the research and for examining a system which both pushes against its environment and is pushed on by its environment (Anthony et al., 2013; Jacobson et al., 2016; Stowell & Welch, 2012). If the system is defined too narrowly, a single classroom, for example, then important factors might be missed in the research; if defined too broadly, i.e., all schools everywhere, the scope becomes too large, important details are missed, and significant differences among school systems may be missed (Anthony et al., 2013; Mania-Singer, 2017; Stowell & Welch, 2012; Thornton et al., 2007). Determining the outer boundary of the school system as opposed to the environment it is operating in also determines for the researcher nuances of relationship among factors as either part of the normal operation of the system or as external factors pressing on the system (Clauset & Gaynor, 1982; Kelly, 2008; Stowell & Welch, 2012). For example, if the district offices of a school district are defined as within the system, then regulations, professional development, curricula, and any other input from the district office to the school will be viewed as part of the normal operation of the system. If, however, the district office is defined as part of the environment the school operates within and not an intrinsic part of the school's system, then any input from the district, whether a

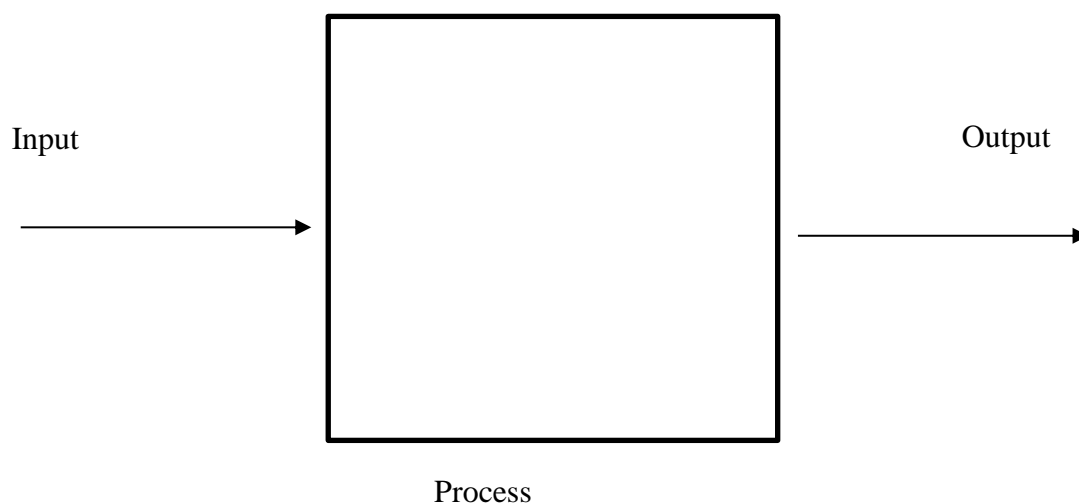
positive or negative relationship, is now an external actor adding to the school's processes (Mania-Singer, 2017; Stowell & Welch, 2012).

Systems theory asks researchers to view a subject not as discrete components, but as interrelated subsystems that impact and interact with each other (Mania-Singer, 2017; Stowell & Welch, 2012). These interactions need to be examined in terms of feedback loops; positive feedback loops amp up a system often causing it to burn out while a negative feedback loop has a regulatory effect on the system, maintaining alignment (Clauset & Gaynor, 1982; Jacobson et al., 2016; Mania-Singer, 2017; Stowell & Welch, 2012; Thornton et al., 2007). An example of a positive feedback loop is found in the reforms instituted by Michael Bloomberg in the New York City school system. One change, or perturbation, Bloomberg made was to break up large high schools into smaller high schools; the intent was to provide a more personalized learning environment for the students in the smaller high schools. However, this change in the system left many students without a school and very little time to find a placement for them, which led to overcrowding in the few remaining larger high schools, which led to larger class sizes, which led to decreased engagement, which led to increased disciplinary challenges, etc. in a positive feedback loop that fed from one seemingly small initial change (Dupre, 2018). On the other hand, Clauset and Gaynor (1982) found that the negative feedback loop between student achievement and teachers' perception of their students' learning gap (i.e., if achievement goes up, the perception of the gap goes down and, conversely, if perception of the gap goes down, achievement goes up) not only helps to regulate the system but could be an opportunity for purposeful reform.

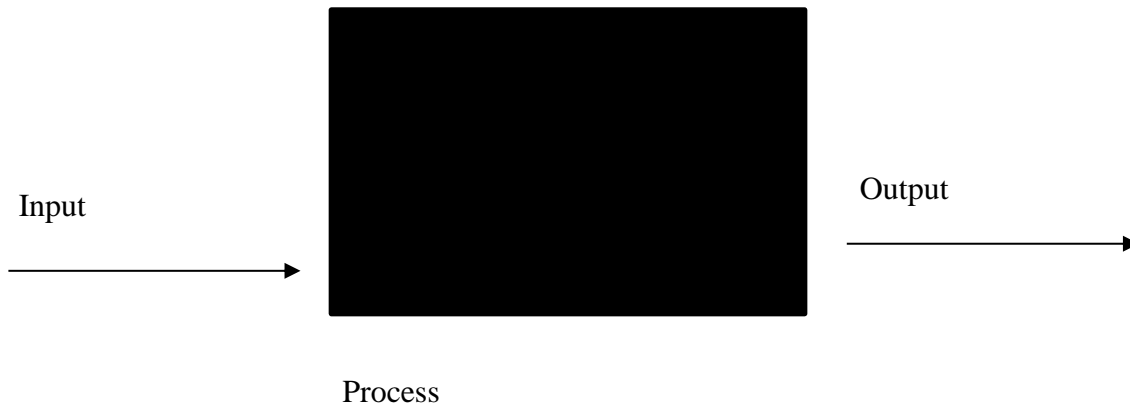
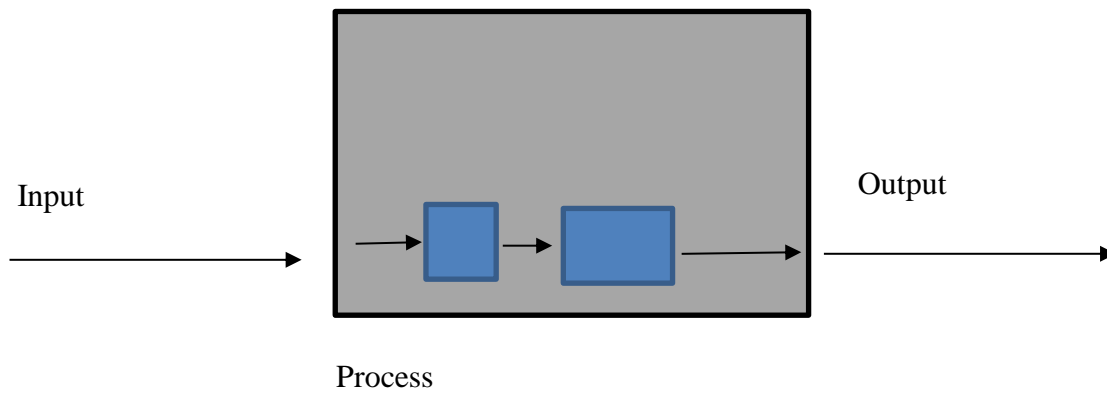
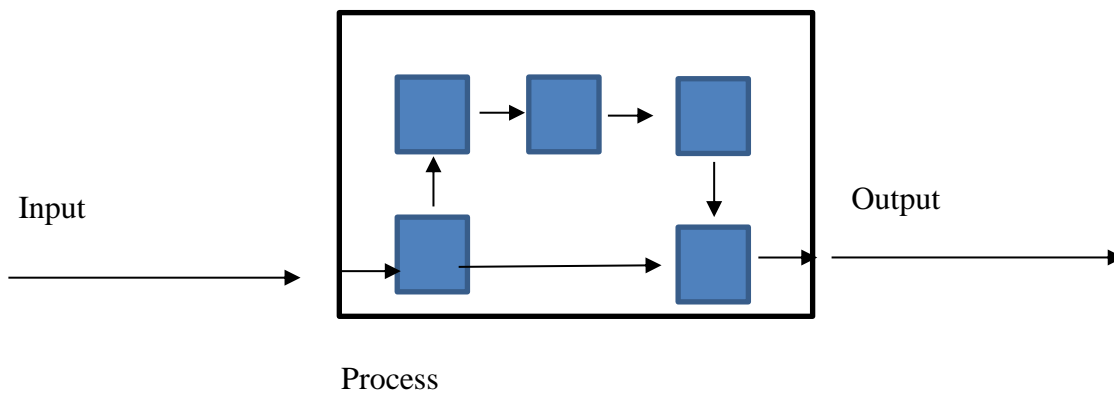
Finally, input-process-output modeling helps researchers examine both the complexity and the interconnectivity of subsystems within the larger system (Stowell & Welch, 2012). This

modeling can be as simple as one input leads to one output with no explanation of the process (Figure 1) and can serve as either the end product if the process is not important or as a first step in diagramming a more complex process. If the input/output diagram is the starting point of diagramming the input-process-output model, increasingly complex models can be used to understand the processes within a system or systems (Figure 2) (Stowell & Welch, 2012). This practice can help to ensure that the researcher or school leader has established not just the end-result data, but the processes that have interacted with each other in order to achieve that output. The transparency achieved in this modeling allows researchers and leaders a better understanding of how reform efforts will affect a system's output and components within processes which could be best targeted for reform (Crick et al., 2017; Stowell & Welch, 2012).

Figure 1 *Input-Process-Output Model*



Source: Stowell & Welch, 2012.

Figure 2 *Black, Grey, and White Box Models***Black Box:****Grey Box:****White Box:**

Source: Stowell & Welch, 2012

Systems Theory in Educational Research.

The foundational components of systems theory have been applied successfully by many researchers to understand schools and educational settings (Clauset & Gaynor, 1982; Jacobson et al., 2016; Thornton et al., 2007). Feedback loops have been useful for researchers attempting to assess both behavior in an educational system and methods for achieving change in an educational system (Clauset & Gaynor, 1982; Jacobson et al., 2016; Thornton et al., 2007). The research of Jacobson et al. (2016) used feedback loops to explain nonlinearity in cognitive activation among students, but postulated that feedback loops could be applied more broadly to educational systems. Other researchers have examined feedback loops to identify key systems to influence transformative change. Clauset and Gaynor (1982) determined that there are four feedback loops influencing achievement; while three positive feedback loops can affect change in ineffective schools, the one “negative feedback loop involving achievement, the perceived learning gap, appropriateness and intensity of instruction, and learning” (p. 57) is the lynchpin for real change. Thornton et al. (2007) identified the key feedback loop for transformative change as the one among program evaluation, organizational learning, and systems thinking. While these researchers determined two distinct models of educational systems, both agree that a carefully monitored negative feedback loop, a key component of systems theory, is essential to the success of a school system (Clauset & Gaynor, 1982; Thornton et al., 2007).

Complexity Theory

There is significant overlap between systems theory and complexity theory, but while systems theory attempts to simplify systems in order to understand their behaviors, complexity theory tolerates a certain level of unpredictability, stemming from its roots in catastrophe and chaos theories, while also utilizing a specific set of rules that seem to hold true across complex

adaptive systems in order to harness their natural tendency toward transformative change. Some of these rules include agents that interact with each other and their environment; feedback loops that lead to self-organization; adaptation, evolution, and emergence are critical features of an active system; and disequilibrium and perturbations lead to essential changes (Anthony et al., 2013; Jacobson et al., 2016; Kershner & McQuillan, 2016; Kloos et al., 2019; Mason, 2008a; Mason, 2008b; Morrison, 2008; Radford, 2008; White & Levin, 2016; Wood & Butt, 2014).

While systems theory looks at feedback loops as either stimulating or regulating to the system, complexity theory understands feedback loops as necessary perturbations contributing to the complex, interrelated systems' tendency toward self-organization (Mason, 2008b; Stamovlasis, 2014; White & Levin, 2016; Wood & Butt, 2014). Rather than being a disturbance to the system, feedback loops in complexity theory are part of the process of self-organization. If the interrelated systems are out of balance or out of organization, a positive or negative feedback loop will develop spontaneously or can be introduced by an actor from outside the complex system in order to catalyst self-organization (Mason, 2008b; Stamovlasis, 2014; White & Levin, 2016; Wood & Butt, 2014). The goal of this self-organization is both increasing stability and increasing adaptation to the complex system's environment; stagnation and immobility will lead to the eventual end of a complex system (Mason, 2008b; Stamovlasis, 2014; White & Levin, 2016; Wood & Butt, 2014).

A natural result of this quest for self-organization in complexity theory is the presence of adaptation, evolution, and emergence (Kershner & McQuillan, 2016; Mason, 2008b; Stamovlasis, 2014; White & Levin, 2016; Wood & Butt, 2014). Feedback loops in complex systems result in the system adapting to the changes, evolving to meet the changing needs, and, frequently, the emergence of new agents or entire systems (Mason, 2008a; White & Levin, 2016;

Wood & Butt, 2014). Understanding this process helps researchers to explain observations of systems, predict possible systemic behaviors, and test hypotheses regarding purposeful attempts to create changes in complex systems (Radford, 2008; White & Levin, 2016; Wood & Butt, 2014). When these complex processes are ignored or misunderstood, changes in complex systems can seem random, unpredictable, or isolated to discrete components of interrelated systems; this can obscure critical leverage points for transformative change in complex systems (White & Levin, 2016; Wood & Butt, 2014).

When researchers or change leaders examine complex systems for opportunities to guide or influence adaptation, evolution, and emergence, those opportunities are in complexity theory's understanding of disequilibrium and purposeful perturbations (Stamovlasis, 2014; White & Levin, 2016; Wood & Butt, 2014). When complex systems are in a state of disequilibrium, they are particularly susceptible to feedback loops which create emergence (Stamovlasis, 2014; White & Levin, 2016). When researchers or change leaders examine complex systems for disequilibrium, systems within the complex system that are out of balance, they can leverage the disequilibrium with purposeful perturbations which create feedback loops within the systems (White & Levin, 2016; Wood & Butt, 2014). In this way, rather than relying on the natural cycles inherent in chaos and catastrophe theory on which complexity theory builds, researchers and change leaders can intervene in the natural cycles to encourage the development of the systems and organization that will create the hoped-for changes in the complex system (White & Levin, 2016; Wood & Butt, 2014).

Schools as Complex Adaptive Systems.

The rules of complexity theory have found traction in the efforts to understand schools as complex adaptive systems (CAS). Agents within a CAS interact with each other within the

system and with elements of their environment; the environment of an educational CAS might include local and federal government regulations, technology, economic pressures, and the physical environment (Anthony et al., 2013; Mason, 2008b). Education systems and individual schools interact with each of these pieces of their environment, both feeling pressure from them and pushing back against each element. Agents within a CAS also interact with each other. For example, teachers and students interact with each other, administrators and teachers interact with each other, and administrators and students interact with each other; and all of these interactions contribute to the increasing complexity of systems that interact with each other (Mason, 2008a; Morrison, 2008; Radford, 2008). And, similar to a food web in biological CAS, the multiple complex systems within an individual school push and pull on each other in interactive ways contributing to the overall CAS that is even a single school, let alone a district, state, or nation of schools (Mason, 2008a; Morrison, 2008; Radford, 2008).

The internal interactions among agents and sub-systems within an educational CAS frequently result in positive and negative feedback loops; systems theory already established that feedback loops could be found in educational systems, but complexity theory adds the nuance that these feedback loops result in self-organization (Jacobson et al., 2016; Kershner & McQuillan, 2016; White & Levin, 2016). Educational research finds evidence of self-organization in educational systems via feedback loops among individual agents in occurrences such as problem-solving convergence among members of a discussion group (Jacobson et al., 2016) or an individual student building meaning through discussion-based inquiry (Morrison, 2008).

Education researchers find additional evidence in understanding educational systems as CAS when they look for the traits of adaptation, evolution, and emergence. Especially when

attempting to understand the nature of learning, emergence has served to explain observable phenomena (Jacobson et al., 2016; Kloos et al., 2019; Mason, 2008a; Mason, 2008b; Morrison, 2008; Radford, 2008; Wood & Butt, 2014). For example, Stamovlasis (2014) examined student performance in science and the emergence of cognitive constructs, and was able to extrapolate from his data to make the epistemological conclusion that the nonlinear results in his analysis could only be explained by the system being observed, that is, “[t]he ontology that the present findings suggest is that of a *Complex Adaptive System (CAS)*, where *self-organization mechanisms* and the dynamics of the system are the causal interpretation of the nonlinear phenomenology” (p. 61). In other words, the learning could not be explained by anything intrinsic in the curriculum or the students but was a result of the system itself; that the very design of the environment and the nature of learning produced the results found in the study. Emergence has been found to be such a strong component of learning, that some researchers suggest that curriculum should be designed not only to account for this factor, but to capitalize on it (Byrne, 2014; Kloos et al., 2019; Morrison, 2008). As a field, complexity theory contributes emergence not only as a lens to understand educational systems and their reform, but, potentially, the very nature of learning itself.

The frameworks of complexity theory and CAS serve both as a construct with which to understand educational systems and with which to affect educational systems. Building on the natural tendency of CAS to evolve, for new subsystems to emerge and self-organize, researchers have pressed on distinct subsystems in order to create perturbations and disequilibrium (Kershner & McQuillan, 2016; Morrison, 2008; White & Levin, 2016) to create purposeful change. In examining change leadership in urban schools, Kershner and McQuillan (2016) determined that complexity theory applied to schools because of the interdependency of the systems, the success

of networked leadership, and the strong influence of attractors such as culture on multiple systems. The researchers then examined the success of networked leaders at creating change by taking advantage of CAS generally existing in a state of disequilibrium. Those leaders with stronger networks, more connections to the system, were better able to guide the system's tendency toward self-organization (Kershner & McQuillan, 2016). Purposeful perturbations can also be used from non-leadership subsystems, again capitalizing on a CAS's tendency toward self-organization when faced with disequilibrium (Morrison, 2008; White & Levin, 2016).

Complex Systems Theory

These two lenses complement each other and merge to become the single lens of complex systems theory, which will be the lens used from this point forward unless systems or complexity theory is explicitly cited. Complex systems theory combines the compatible rules of systems theory (such as feedback loops and input-output modeling) with complexity theory (such as purposeful perturbations and emergence) to understand an environment as a complex system comprised of multiple, interacting systems in dynamic relationship with each other (Anthony et al., 2013; Hilpert & Marchand, 2018; Jacobson et al., 2016; Kershner & McQuillan, 2016; Kostoulas et al., 2018; Morrison, 2008). Educational research applies complex systems theory to understand how systems such as attendance, discipline, and curriculum interact with each other and develop emergent organizations, either purposefully or accidentally, rather than operate as independent functions in an environment (Anthony et al., 2013; Hilpert & Marchand, 2018; Jacobson et al., 2016; Kershner & McQuillan, 2016; Kostoulas et al., 2018; Morrison, 2008). The rules of particular concern for this research are feedback loops, disequilibrium, self-organization, and purposeful perturbations.

Participatory Action Research

In most research design, the theoretical framework provides both a boundary and a lens for the research while the methodology provides a process for answering the research question (Creswell & Guetterman, 2019; Marshall & Rossman, 2016; Maxwell, 2013). For this research, however, the methodology will contribute to the theoretical framework. Participatory action research, while a viable, vetted, and accepted method of academic research also applies a particular lens to research questions and purposefully inserts the researcher as a participant in the process (Creswell & Guetterman, 2019; Marshall & Rossman, 2016; Maxwell, 2013). It also attempts to democratize research by incorporating as fully as possible the voices of the researched into the actual production of the research rather than the traditionally hierarchical model of academic research (Billett & Martin, 2018; Cook et al., 2019; Zhu, 2019). The goal of participatory action research is not just the collection of data, but to actually attempt to enact a meaningful change in the test subject, usually with a social justice lens (Creswell & Guetterman, 2019; Marshall & Rossman, 2016; Maxwell, 2013). Because of the explicit role of the researcher, the democratizing role of the researched, the explicit lens that participatory action research applies, and the intended social justice outcome that this methodology seeks, participatory action research will serve as both the methodology of research and the final component of the theoretical framework for this research design.

In this research, the researcher took an active role in the test site as an instructor and facilitator of complex systems theory and rubric design. This active role is intentional as a component of the theoretical framework in order to ensure that the researcher had deep knowledge of the participants, the test site, and the systems within the school (Creswell & Guetterman, 2019; Marshall & Rossman, 2016; Maxwell, 2013). Because the foundational

premise of this research is that schools are complex systems, external examination of a black box system (Figure 2) would not provide the detailed understanding of the complex system necessary to write site-specific rubrics for systems assessment; the embedded nature of participatory action research as a methodology provided the grey- and white-box perspective necessary for more holistic analysis. Also, as an embedded researcher, the voice of the participants in the focus group became the primary driver in the creation of the assessing rubrics, while the researcher was able to remain present as a coach rather than an outside provider of answers. While there is a risk of undue influence in this model (Creswell & Guetterman, 2019; Marshall & Rossman, 2016; Maxwell, 2013) or a concern that the traditional hierarchy of academia would persist despite the best efforts at democratization (Cook et al., 2019; Zhu, 2019), efforts were taken to mitigate both of these potential methodological errors (see Chapter 3).

In addition to the embedded nature of participatory action research, the explicit social justice lens and outcome will serve as part of the theoretical framework. While some might argue that the definition of “social justice” is up for debate, the contemporary upheaval of the COVID-19 pandemic; Black Lives Matter Protests; Me, Too movements; anti-work movements; and other rising voices of marginalized communities has sharpened the definition and aligned most voices around a more narrow definition: the promotion of equity for traditionally marginalized communities through systemic and systematic change (Cartabuke et al., 2019; Dorime', 2018; Niño & Perez-Diaz, 2021). Details are explored below, but marginalized groups have frequently been unaffected or even harmed by contemporary reform efforts, even when the goals of those efforts include statements about addressing opportunity or achievement gaps (Dupre, 2018; Gutierrez & Waitoller, 2017; Lenhoff & Ulmer, 2016; Lubienski, 2017; Orfield & Luce, 2016; Ross, 2020). In order to address this gap in reform success, the explicit focus on

social justice outcomes in the participatory action research methodology (Creswell & Guetterman, 2019; Marshall & Rossman, 2016; Maxwell, 2013) also contributes to the theoretical framework for this research. While the researcher stepped back into a more passive observer role in the second part of the research design, the intended outcome remained an explicit focus on transformative school goals. The learning, rubrics, site evaluation, and goal writing phases of the methodology were all framed in the social justice outcomes explicit in participatory action research (Creswell & Guetterman, 2019; Marshall & Rossman, 2016; Maxwell, 2013).

School Improvement Efforts

The bulk of the political and financial backing in education reform efforts the past forty years has been behind neoliberal reforms (Dupre, 2018; Gutierrez & Waitoller, 2017; Lenhoff & Ulmer, 2016; Lubienski, 2017; Ross, 2020). Neoliberalism takes its name, not from any political party affiliation, as both Democrat and Republican politicians and administrations have been strong proponents of neoliberal reform, but from its push to limit, or liberalize, government control on the education system (Gutierrez & Waitoller, 2017; Lenhoff & Ulmer, 2016; Lubienski, 2017; Ross, 2020). One major component of neoliberal reform is the standardization and privatization of curriculum. When curriculum is standardized across schools rather than individualized at any level (student, class, school, district, or even state), private, for-profit curriculum developers are better situated to sell their products in a competitive, mass-market-based system (Gutierrez & Waitoller, 2017; Lenhoff & Ulmer, 2016; Lubienski, 2017; Ross, 2020). An added impetus for schools to adopt neoliberal reforms and to seek out standardized curriculum is government-mandated improvements on standardized assessments in order to receive necessary funding (Gutierrez & Waitoller, 2017; Lenhoff & Ulmer, 2016; Lubienski,

2017; Ross, 2020). If funding is tied to assessment scores and assessments are tied to standardized curricula, then schools are incentivized to spend their government allocated funds on privately produced curricula which often promise quick results on standardized assessments in order to acquire more funding (Gutierrez & Waitoller, 2017; Lenhoff & Ulmer, 2016; Lubienski, 2017; Ross, 2020).

In addition to the privatization of curriculum development and adoption, individual systems within schools, such as custodial, transportation, or food services, and even entire schools have been subject to privatization under the push to reduce government involvement in schools (Gutierrez & Waitoller, 2017; Lenhoff & Ulmer, 2016; Lubienski, 2017; Orfield & Luce, 2016; Ross, 2020). Charter schools are the neoliberal solution to government run schools: privately operated schools funded by public money (Gutierrez & Waitoller, 2017; Lenhoff & Ulmer, 2016; Lubienski, 2017; Orfield & Luce, 2016; Ross, 2020). In the last ten years, Chicago, a particular focus of neoliberal reform efforts, has seen an incredible surge in charter school openings which has resulted in a complementary increase in public neighborhood school closures (Gutierrez & Waitoller, 2017; Lenhoff & Ulmer, 2016; Lubienski, 2017; Orfield & Luce, 2016). While reformers argue that charter schools provide open access to students, opportunities for targeted curriculum, and improved standardized test scores (Gutierrez & Waitoller, 2017; Lenhoff & Ulmer, 2016; Lubienski, 2017; Orfield & Luce, 2016; Ross, 2020), those challenging the surge in charter schools in Chicago suggest that admissions processes are not as democratic as advertised and performance on standardized testing is no better, and sometimes worse, than in public schools (Gutierrez & Waitoller, 2017; Lenhoff & Ulmer, 2016; Lubienski, 2017; Orfield & Luce, 2016). Social justice researchers also argue that the reduction in neighborhood schools degrades a cornerstone of urban communities, especially in

marginalized populations (Dupre, 2018; Gutierrez & Waitoller, 2017; Lenhoff & Ulmer, 2016; Lubienski, 2017; Orfield & Luce, 2016; Ross, 2020).

While neoliberal reform efforts have been the hallmark of the last forty years of reform efforts, the twenty-first century has a counter-argument to neoliberalism in research focused on aligning schools to or catching them up with changes in the economy and society. Examination of current school models shows that school systems have not co-evolved with the rest of society; essentially, schools continue to operate on an Industrial Age model of sorting students and preparing the bulk for manual labor rather than evolving into the Information Age and meeting the demand for producing thinkers and creators for the new economy (Aslan & Reigeluth, 2013; Choi et al., 2020; Duffy, 2008; Johnson, 2018; Soulé & Warrick, 2015). Criticisms of recent school reform efforts argue that the standard model curriculum design prevalent in most educational settings that is assessed by a standardized test do not reflect the current needs of society. A more rapid, holistic shift to learner-centered education, in reflection of the technology-driven learner-centered society, is called for by researchers in this field (Aslan & Reigeluth, 2013; Choi et al., 2020; Duffy, 2008; Johnson, 2018; Soulé & Warrick, 2015).

The criticisms of neoliberal school reform efforts are not merely qualitative; quantitative research suggests that past reform efforts have not garnered desired results. Kelly's (2008) primary argument for an alternative mode of school reform research is that decades of school reform have resulted in no significant improvement in student achievement, both in terms of academics and behavior. This analysis is held up in Meyer and Werth's (2016) examination of academic test scores in comparison to the nation's global economic competitiveness which found no correlation between student achievement test scores in mathematics and science and a high ranking on the Global Competitiveness Index. Additionally, research suggests that public policy

has also contributed to a narrow, segregated approach to school reform, hindering a shift to a twenty-first century educational structure. Johnson (2018) argues that schools, hindered by No Child Left Behind (NCLB) and its emphasis on standardized testing in math and English Language Arts, have not shifted rapidly enough from an industrial age model to an information age model to meet the needs of our changed society. Areas of concern include “the lack of emphasis on critical thinking and problem solving.....[and] the decreased focus on communication of ideas through multiple formats” (Johnson, 2018, p. 333). Johnson’s concerns with NCLB are borne out in nationwide reading and mathematics scores which were either statistically the same or lower in 2019 as compared to 2017 in 4th, 8th, and 12th grade sampling (NCES, 2019a; NCES, 2019b).

One of the major impediments to these holistic school reform efforts has been the overwhelming impact of neoliberal school reforms since the publication of *A Nation at Risk* (Gutierrez & Waitoller, 2017; Lubienski, 2017; Orfield & Luce, 2016; Ross, 2020). Even reform efforts, such as the Montessori school model, that show significant student achievement in comparison to the traditional and neoliberal models of education, face resistance to large-scale adoption (Lillard, 2019). Research generally acknowledges that the politically popular, assessment-based neoliberal reforms have failed to achieve the intended gains (Dupre, 2018; Gutierrez & Waitoller, 2017; Lubienski, 2017; Ross, 2020), yet other voices of reform tend to address the problem in a piecemeal fashion. Some researchers look at the role of teacher-leaders in reform (Datnow, 2020), some look at the directionality of reform (Dueppen & Hughes, 2018), some look at school-wide curricular (Borda et al., 2018) or disciplinary (Buckmaster, 2016) reforms. Little current research has looked at the effects of holistic, systemic reform utilizing complexity and systems theory as a guide for practitioners (Duffy, 2008; Kelly, 2008).

Understanding School Improvement Challenges Through Complex Systems Theory

Schools are now twenty years into the twenty-first century and have yet to pivot effectively to a twenty-first century model. Complex systems theory might provide some insight into this challenge. Reform efforts and legislation often treat schools and education in an industrial model as mechanistic processes, addressing the consistent failures by attempting to fix one cog in the machine at a time, such as increasing certification standards, changing assessments, integrating special education students, monitoring discipline practices (Kelly, 2008; RSA, 2008; Soulé & Warrick, 2015). Complex system theory suggests that the reason these reform efforts have failed is because they do not take into account the true nature of schools and education as complex adaptive systems (Anthony et al., 2013; Clauset & Gaynor, 1982; Crick et al., 2017; Duffy, 2008; Jacobson et al., 2016; Kelly, 2008; Kershner & McQuillan, 2016; Kloos et al., 2019; Mania-Singer, 2017; Mason, 2008a; Morrison, 2008; White & Levin, 2016; Wood & Butt, 2014). If any change effort is to be successful, it must be systemic, i.e., address every component in the system, from the transactional environment to the district, to the schools, to the programs; piecemeal efforts, such as the one-school-at-a-time or one-system-at-a-time approaches have failed to result in systemic change because they do not address the entire system (Duffy, 2008; Kelly, 2008; Radford, 2008; White & Levin, 2016).

Benefits of a Complex Systems Approach to School Improvement

One benefit of complex systems theory is that its practical application can result in effective computer modeling to assist school change efforts (Clauset & Gaynor, 1982; Crick et al., 2017). Once feedback loops are modeled, that data can be used to program a computer model that can assess the potential effects of various changes before implementing them. One such model was programed to be incapable of internal change and required an external catalyst,

in this case an intervention initiated by a principal, to affect student outcomes. Researchers used the model to test various policy changes and determined that the changes that had the greatest effect on student achievement are “those that better teacher skills, raise teacher expectations for low-achieving students, and maximize time available for instruction” (Clauset & Gaynor, 1982, 58). Furthermore, the researchers concluded that the best way to improve these areas was through training current staff rather than through recruitment and through appropriate supervision of the implementation of the training (Clauset & Gaynor, 1982). Complex systems theory also provides frameworks for designing computer models to supply timely data for change leaders, a critical need for those attempting to use perturbations and disequilibrium to guide emergence and evolution in a complex adaptive system (Crick et al., 2017).

Complex systems theory, when applied to current practices, can also be an effective means of refining school reform efforts. Program evaluation is a tool already in place to assess the effectiveness of educational programs; however it frequently does not result in organizational or systemic change. Balanced Scorecard, imported into education from the business world, looks at program evaluation through a systems lens, but its focus on resource management and stakeholder interests rather than student outcomes has, generally, limited its adoption to higher education settings (Beard, 2009; Camilleri, 2021; Reda, 2017). Complex systems theory can be applied to program evaluation, however: when the feedback loop among program evaluation, systems thinking, and organizational learning was examined and utilized in one research process, real and lasting change in a school system was made (Thornton et al., 2007). While different research places the root of change in different feedback loops (Clauset & Gaynor, 1982; Thornton et al., 2007), complex systems theory clearly places the point of transformative change in the feedback loops inherent in a complex adaptive school system.

Complex systems theory also pushes back on a siloed approach to school reform. An extensive study of Chicago elementary schools identified five critical systems that, not only must be present for a successful school system, but must be working well together (Bryk, 2010). These five systems, examined below, have been subject to extensive research as important individual systems within schools, but Bryk's study stands out as extensive, longitudinal, and using a complex systems lens rather than examining each component individually. Additional research shows that lasting and meaningful school improvement must be systemic, not fragmented (Bryk, 2010; Choi et al., 2020; Duffy, 2008; Kelly, 2008; Kershner & McQuillan, 2016; Mania-Singer, 2017; Thornton et al., 2007; White & Levin, 2016).

Five Essential Systems

Large-scale studies of organizational school systems and their effect on students, teaching, and classrooms are challenging but critical for their insight into effective school reform. In 2010, researchers at the Consortium on Chicago School Reform attempted to answer the question of what makes the difference in whether a school is successful or not. Through analyzing longitudinal data of the elementary schools in Chicago, Bryk (2010) "identified five organizational features of schools that interact with life inside classrooms and are essential to advancing student achievement." These five features are coherent instructional guidance system, professional capacity, strong parent-community-school ties, student-centered learning climate, and leadership drives change. In addition to identifying these five features, the longitudinal survey data provided indicators for each of these areas and some interesting findings related to those indicators, including the fact that "a material weakness in any one support, sustained over several years, undermined other change efforts and improvement rarely resulted" (Bryk, 2010). While this study found strong indication of which systems are critical for a healthy complex

school system, it did not address the question of how to know if those individual systems and, therefore, the system as a whole are functioning to the benefit of stakeholders (Bryk, 2010).

While no other study has examined these exact five systems together, Bryk's extensive analysis, along with plethora studies on each of these systems individually, serves as the foundation for the current research which also looked at these five systems as critical for school improvement efforts.

Coherent Instructional Guidance System

Bryk's (2010) description of this system includes elements of instruction beyond the teacher in the classroom and the curriculum being delivered. Almost a complex adaptive system within a complex adaptive system, the coherent instructional guidance system includes multiple components of instructional delivery: the teacher, the content, the environment in which it is delivered, the tools with which it is delivered, and more. Access to adequate materials for instruction can greatly impact student outcomes (Edessa, 2017). Complexity theory suggests that, in addition to the complexity of the instructional system itself, the very nature of the learning it is intended to create should be understood as a complex adaptive system (Bara & Xhomara, 2020; Byrne, 2014; Jacobson et al., 2016; Morrison, 2008). Complex systems theory suggests that components such as feedback, emergence, and self-organization could be potential opportunities, not only for assessing the coherence of an instructional guidance system, but for finding opportunities to lead transformative change (White & Levin, 2016; Wood & Butt, 2014).

Professional capacity

Bryk (2010) is very clear that the professional capacity of the teachers in a school is a critical system and that it is more effective to develop the teachers already on staff than it is to hire new teachers. But professional capacity itself is a term currently undergoing a possible shift

in definition. While teacher professionalism has historically been loosely defined, recent trends have seen a shift from a stronger emphasis on occupational professionalism toward organizational professionalism (Biesta, 2015; Kunter et al., 2013; Murray, 2014; Previts et al., 2013; Rimmer & Floyd, 2020; Torres & Weiner, 2018). The rise of charter schools, a particularly popular neoliberal reform, has led to an increased emphasis on organizational professionalism, with structures for instruction, classroom management, and student engagement dictated by the management team rather than being the purview of the individual teacher (Torres & Weiner, 2018). According to one study, while this shifting definition provides structure that charter teachers find benefit in, it also seems to undermine their self-efficacy and reduces the likelihood that they will remain in the profession long-term (Torres & Weiner, 2018). On the other hand, another study showed teacher efficacy can improve with strong professional conferences (Rimmer & Floyd, 2020).

Research also indicates that the type of professional development provided impacts the long-term implementation rate (Lin et al., 2015) and that teacher expertise should be viewed as an on-going process requiring continued development (Sorensen, 2017). Further research suggests that the professional competence of teachers has a direct effect on student outcomes (Kunter, et al., 2013). Additionally, direct links between teacher professional capacity, leadership that drives change, and student achievement have been established. One study looking at teacher self-efficacy and professional capacity found strong ties to the ways in which school leaders promoted and utilized teachers as leaders (Lee & Chiu, 2017). Finally, when examining the effect sizes of types of school leadership, leaders promoting and participating in teacher learning and development had an effect size of .84 on student achievement (Robinson et al., 2008).

Strong Parent-Community-School Ties

Research shows time and again that strong ties among parents, the community, and a school improve student achievement in both academics and social/behavioral skills (Kyzar & Jimerson, 2018; Lawrence, 2015; Lohmann et al., 2018; Smith et al., 2019). Research also insists that the relationship must be reciprocal, providing opportunities for families to communicate to schools just as frequently and openly as schools communicate with families (Kyzar & Jimerson, 2018; Lohmann et al., 2018) and must be careful to avoid doublespeak that will result in false ties and no true reform (Perkins, 2015). This same thought is found in research that finds that parents who are trained to give feedback to students impact student growth (Hall, 2020) and in research that finds benefit in reform efforts embedded authentically within the community rather than imposed from outside the community (Latunde, 2017; Mette et al., 2019). The reciprocal nature of this relationship falls neatly into complex systems theory's understandings of networks and feedback loops (Lawrence, 2015); in other words, though the research has not strongly or explicitly explored family-community-school ties through a complex systems lens, it has given ample evidence to move in that direction.

Student-Centered Learning Climate

The pivot to twenty-first century education models relies on a student-centered learning model. In discussions of twenty-first century skills, similar themes arise as essential skills students will need to be successful post-high school: social skills, problem-solving skills, self-directed learning, information-communication technology literate, to name a few (Kereluik et al., 2013; Little, 2013; Luterbach & Brown, 2011; McPhail, 2016; Soule' & Warrick, 2015). All of these skills are student-centered. Research indicates that both the environment (Buckmaster, 2016; Foggett et al., 2017) and the instruction (Bara & Xhomara, 2020; Borda et al., 2018; Üzü

& Pesen, 2019) centered around student need and interest impacts student outcome positively in the short term. However, one study did find that Finnish students with “risky” background characteristics performed worse with student-centered instruction than teacher-directed instruction on math and science assessments (Saarinen et al., 2020). The impact of student-centered instruction is borne out also in its impact in the later lives of students who experienced it. In examining indicators of success of graduates of a school which explicitly implemented student-centered learning practices on the model suggested by Howard Gardner’s research in multiple intelligences, graduates identified four components of the curriculum as key to their success in life: 1. Projects, project-based learning, and senior exhibitions; 2. Leadership development; 3. Strengths-based program; and 4. Experiential learning. Additionally, respondents had an above-average employment rate and college persistence rate, further indicators of success (Kunkel, 2016). Complex systems theory’s modeling of feedback loops and understanding of emergence as the natural result of perturbations and disequilibrium provide structure and significance to a student-centered, twenty-first century instructional model: rather than shifting the environment of a school to be student centric and hoping for the best, school leaders can monitor the resulting perturbations and disequilibria that are inevitable in a complex adaptive system, especially one focused on learning, and take advantage of opportunities to create purposeful perturbations and feedback loops in order to shepherd transformative change and positive student achievement.

Leadership That Drives Change

While the health of every system is important, research consistently suggests that leadership is the critical component to both school success and successful school reform (Bryk, 2010; Van Der Voort & Wood, 2014; Kershner & McQuillan, 2016; Robinson et al., 2008).

Bryk (2010) argues that every element must be present and strengthened but “strong local leadership acting on the four other organizational elements constitutes the essential ingredients for spurring school development.” Other research has focused on the importance of leadership in driving change. Van Der Voort and Wood’s (2014) examination of the school improvement process focused on engaging school leaders in the process, training them inductively in both its purpose and methods. Similarly, Kershner and McQuillan (2016) identified leadership as the key to a school’s readiness to adapt to change. They argue that decentralized leadership is more prepared for adaptive change and that the most critical factor a leader must nurture when guiding change is the culture of the system (Kershner & McQuillan, 2016). Research by Brown (2016) suggests that school leadership can also influence student achievement by influencing the environment that the system is operating in. Finally, Robinson et al. (2008) identified four of the dimensions of leadership with effect sizes ranging from .27 to .42 with one outlier with an effect size of .84. Aggregating these effect sizes presents a skewed view of the role of leadership on student achievement; given the wide range of effect sizes, understanding the different dimensions of leadership and their effects is just as critical as understanding the effect of leadership generally on a school system. These individual studies demonstrate school leadership’s impact on the learning climate, the professional capacity of teachers, and the school’s parent-community-school ties, three of the four other critical systems for school reform.

Self-Efficacy of School Leaders

Teacher self-efficacy and collective efficacy have been the subject of significant research in recent decades. Consistently in John Hattie’s analysis of effect sizes of influences on student achievement, collective teacher efficacy has an outsized effect; most recently it has the largest effect size of 1.57 and the largest potential to accelerate student achievement (2017). Similarly,

research by Tschannen-Moran and Barr (2004) found significant positive relationship between student achievement in reading, writing, and math and collective teacher efficacy. This relationship remained in place for writing even when controlling for socioeconomic status of the students (Tschannen-Moran and Barr, 2004). Parsing the matter more individually, the work of Lazarides et al. (2022) found that individual teacher efficacy with regards to particular modes of instruction had different longitudinal impacts on students' interest in mathematical education. Regardless of whether the research addresses collective or individual efficacy, the indication is consistently that the belief of those doing the work that the work has impact will affect the size of the impact the work has.

Research further indicates that teacher efficacy is impacted by the environment and climate established by the principals or other leaders in the school. Research concluded by Skaalvik and Skaalvik found a strong positive relationship between collective teacher efficacy and teacher self-efficacy (2007). As collective efficacy increases, self-efficacy increases and vice-versa both resulting in higher student expectations and outcomes (Skaalvik & Skaalvik, 2007). In addition to the collective efficacy of teachers, instructional leadership of principals in the school environment has been found to significantly impact teacher self-efficacy (Bellibas & Liu, 2017). While the research by Bellibas and Liu utilized teacher perception of principal instructional leadership, Ma and Marion (2021) added support to their conclusion that principal instructional leadership and teacher self-efficacy are linked by examining the ability of a principal to develop a positive learning climate and manage the instructional program. This research also established a strong link between the general climate of the school, developed by the school leadership, and teacher self-efficacy. Research continues to indicate that both the

collective and self-efficacy of teachers and, by extension, leaders in a school are interconnected and essential for positive student outcomes.

Multiple Measures Approach to Continuous School Improvement

Because schools are complex adaptive systems with multiple sub-systems that constantly interact with each other, research consistently indicates that a single or composite measure does not adequately convey the health or success of a school (Bae, 2018; Klein, 2018; Knoeppel & Brewer, 2011; Kunkel, 2016; Meyer & Werth, 2016). Researchers in Kentucky examined disaggregated assessment scores and discovered that, given the general lag in math scores, a composite index might distort the performance of schools and hide areas of need (Knoeppel & Brewer, 2011). When looking at the post-graduate results of a student-centered curriculum, standardized test scores did not adequately assess school success, especially in settings where experiential learning, which the graduates in this study credit with their success, is emphasized over standardized curriculum (Kunkel, 2016). On a more global scale, when comparing cognitive aptitude scores to global competitiveness, there was so little correlation that the researchers urged caution in utilizing international cognitive achievement scores as a basis for school reform measures (Meyer & Werth, 2016).

Given that schools are complex adaptive systems and that complex systems theory is broadly applicable to educational phenomena, it makes sense that researchers and educational policy are shifting away from a single measure program for assessing school achievement and are relying more and more on multiple measures to analyze student growth and achievement. In the post-NCLB era of accountability, schools need a measurement system that will focus educators' energies on "developing student competencies beyond basic skills...promoting the development of noncognitive skills....and cultivating college *and* career readiness" (Bae, 2018,

p. 6). When the Every Student Succeeds Act (ESSA) replaced No Child Left Behind, schools were required to make this shift toward alternative and multiple measures. While the only requirement in the ESSA is that districts use evidence-based interventions in low-performing schools or in schools where vulnerable groups are struggling, some states and districts are using this as an opportunity to examine their support systems and enact holistic changes that utilize a framework of continuous improvement to support all schools, not just those that are struggling (Klein, 2018). Five components of a multiple measure accountability system could include a broader set of outcome measures, a mix of state and local indicators, measures of opportunities to learn, data dashboards, and school quality reviews, however the ability to transition to this model was contingent on four conditions: capacity, stakeholder engagement, organizational structures, and flexibility and local control (Bae, 2018). Balanced Scorecard could suggest a potential solution to a multiple measures tool for assessing a school's resource alignment to goals (Beard, 2009; Camilleri, 2021; Karathanos & Karathanos, 2005; Reda, 2017), but the data from its one significant implementation at the public-school level, Atlanta, is contaminated by documented assessment fraud (Fantz, 2015; Staff Report, 2015).

The key to the usefulness of a multiple measures accountability system is often timely access to data in order to enable continuous improvement; this access is sometimes enabled through a data dashboard (Bae, 2018; Crick et al., 2017). If change leaders are going to address systemic change in a complex adaptive system, there is a need for a way to aggregate data in a visual form for easy access by leaders. Accomplishing that in a system as complex as education is no easy task. One way to address this challenge is through hierarchical process modeling (HPM), a computer-generated visual representation of a complex system (Crick et al., 2017).

Research also suggests that after-the-case measures are not sufficient for ensuring student growth; implementation assessments of any reform effort must also be used. In Choi et al.'s (2020) analysis of an inclusion model of education for students with IEPs, researchers used two metrics to analyze student achievement: standardized state test scores and a validated analysis tool for assessing the fidelity of implementation of a multi-tiered system of support (MTSS) to integrate students on an IEP into general education settings. In examining the data across the schools in their study, Choi et al. (2020) found that there was, on average, growth for students on IEPs for both reading and math. Upon closer examination, however, the data showed that students in schools without fidelity of implementation of MTSS declined in their test scores while students in schools with fidelity of implementation improved significantly in their test scores. The researchers concluded that an MTSS model of inclusion could improve student achievement, but with the caveat that fidelity of implementation is important for the MTSS to have the desired effect on student growth (Choi et al., 2020).

Conclusion

Research has established that complex systems theory is a viable framework for understanding educational settings. Further, research has identified five critical systems necessary to achieve both a healthy educational setting and transformational change: coherent instructional guidance system, professional capacity, strong parent-community-school ties, student-centered learning climate, and leadership that drives change. Additionally, the self-efficacy of those working in and leading educational practice in schools is critical to student achievement. Finally, continuous school improvement is necessary and necessitates multiple measures in order to be effective. A critical component is missing in this field: the practical application. If all of these things are known about schools and the practice of education, how

can they be utilized together to decompartmentalize the work of school reform in order to continuously affect transformational change and improve student growth and achievement?

Chapter III

Design and Methodology

The research presented here is a participatory action research methodology and qualitative analysis which applied complex systems theory as a framework to collaboratively develop practical rubrics for school leaders to utilize to assess the health of their school and to develop actionable school improvement goals. The applicability of a complex systems framework to understand school settings has already been established by prior researchers (Anthony et al., 2013; Clauset & Gaynor, 1982; Jacobson et al., 2016; Kershner & McQuillan, 2016; Kloos et al., 2019; Mason, 2008a; Mason, 2008b; Morrison, 2008; Radford, 2008; Thornton et al., 2007; White & Levin, 2016; Wood & Butt, 2014) and the need for school reform that closes the opportunity gap and prepares all students for a changing and dynamic economy is on-going (Gutierrez & Waitoller, 2017; Lehman, 2015; Kelly, 2008; NCES, 2019a; NCES, 2019b), so the current research assessed the applicability of the framework to guide reform efforts and its effects on the school leaders who participated in the research. Because the research addressed a practical problem with a social justice orientation (Creswell & Guetterman, 2019; Marshall & Rossman, 2016; Maxwell, 2013), participatory action research methodology was used and qualitative analysis was applied to the data collected.

This research addressed the following questions:

1. How does a complex systems framework alter a school leadership group's understanding of their school as a locus of reform?
2. How does collaboratively developing a complex systems assessment tool affect the self-efficacy of a school leadership group with regards to transformative school reform?

3. How does using a complex systems assessment tool to evaluate their school environment affect the self-efficacy of a school leadership group with regards to transformative school reform?
4. How does using a complex systems assessment tool to set transformative school goals affect the self-efficacy of a school leadership group with regards to transformative school reform?

Research Design

Participatory action research was used as a methodology both because a practical solution for a practical problem was the goal of this research and because of the explicit social justice lens of solutions sought in a participatory action research methodology (Creswell & Guetterman, 2019; Marshall & Rossman, 2016; Maxwell, 2013). The researcher worked closely with the field site, given the nature of participatory action research. The field work began with a research group of six members, five teachers of differing subject areas and experience and one special education paraeducator, all employed at the field site. This research group participated in one 4-hour professional development session (Appendix C) in the month prior to the start of a school year researching complex systems theory and the five essential systems for school improvement, under the guidance of the researcher. Before and after the professional development, the participants completed a survey of their baseline knowledge of complex systems theory (Appendix B) in order to determine the efficacy of the professional development. This professional development addressed the first research question: “How does a complex systems framework alter a school leadership group’s understanding of their school as a locus of reform?” This portion of the research had the most significant involvement of the researcher as they provided the content of the professional development. The remaining data

collection was completed through gathering artifacts, finished products from the work group, and interviews with less hands-on contact by the researcher.

Following the time spent in professional development with the researcher, the research team met independently from the researcher and designed a set of 4-point descriptive rubrics using a graphic organizer provided by the researcher (Appendix D). These rubrics were scaled in the categories of “needs improvement,” “basic,” “proficient,” and “distinguished” in order to mirror teacher evaluation language and increase familiarity for practitioners. The rubrics contained descriptive language for each metric and category as well as examples of potential evidence to use for scoring. Each of the five systems assessed by the rubrics (coherent instructional guidance system, professional capacity, strong parent-community-school ties, student-centered learning climate, and leadership that drives change) were assessed by at least three measures of their internal health and by at least one measure of their relationship to the other systems. This process addressed the second research question: “How does collaboratively developing a complex systems assessment tool affect the self-efficacy of a school leadership group with regards to transformative school reform?” Data on this question was collected both through the collection of the completed rubrics and through semi-structured interviews completed near the end of the research process.

In order to address the third research question (“How does using a complex systems assessment tool to evaluate their school environment affect the self-efficacy of a school leadership group with regards to transformative school reform?”), the research group implemented the rubrics in their school setting to assess their site. Each group member individually assessed each system as well as its interaction with the other four systems using the rubrics they designed. Their scores were collected by the researcher and compared for

consistency (see Chapter IV) in order to assess the validity of the evaluative process. Archival documentation of previous CSIP reports were also collected in order to compare the site assessment process piloted here versus the usual method of data collection used to establish site improvement goals. Additional data to address this question was collect through the semi-structured interviews collected near the end of the research process.

Finally, the rubrics were used to facilitate setting transformative school improvement goals in order to address the final research question: “How does using a complex systems assessment tool to set transformative school goals affect the self-efficacy of a school leadership group with regards to transformative school reform?” The research group met independently, compared their scored rubrics, and set achievable school goals. These goals were analyzed through a brief in vivo coding process in comparison to goals written in previous school years. Data from the semi-structured interviews was also included to answer this research question, however the interviews were completed prior to this phase so participants were asked to think ahead to this part of the process rather than to reflect on the completion of the task.

Role of the Researcher

A potential shortcoming of participatory action research is researcher bias because the researcher is embedded as a participant in the test site (Creswell & Guetterman, 2019; Marshall & Rossman, 2016; Maxwell, 2013). For this research, the researcher was only embedded for the first phase of the field work and the following steps were taken to mitigate bias. First, the site chosen was not the researcher’s regular place of employment; this was done explicitly to avoid both undue influence because the researcher holds a position of authority in their employed role and to avoid significant researcher bias for or against the test site. Because the researcher provided the professional development to the research group regarding complex systems theory

and the five critical components for school improvement, all materials used for that professional development underwent rigorous peer and committee review prior to use in the field. The review checked for undue researcher bias as indicated by excessive use of positive or negative adjectives or misleading information about complex systems theory, the review of recent educational reform efforts, or the five critical systems. After the first phase of the research, the researcher deliberately took a step back from the research group and did not participate in any further production of materials, assessment, or goals. The only role of the researcher after the delivery of the professional development was to check-in and remind the group of due-dates and to complete the semi-structured interviews. All of these steps were taken to help ameliorate potential bias from the researcher's position as an embedded participant in a part of the field work.

As the field work moved on from the first phase, the researcher's role became less embedded and took on more of a traditional role of a researcher as an observer and data collector. During the remaining portions of the field research, the researcher collected archival documents, research documents (the completed rubrics, site assessments, and goal statements), and completed semi-structured interviews with the research group.

Setting and Participants

The field site was chosen because its demographics closely match state demographics, it is representative of a suburban high school, the principal has a reform and growth mindset, and the researcher had access to the site through professional connections. Permission to work at this site was obtained from the district superintendent, the district assistant superintendent of equity and instruction, and from the site's principal. The student population of the school in the 2020-2021 school year was 1,723 students. Washington State recorded the students' racial and ethnic

backgrounds as 48.4% white; the other 51.6% of students belonged to another reportable ethnic group, the largest reportable demographics being Hispanic/Latino (19.7%) and Two or More Races (14.2%). This site employed 83 classroom teachers and had a per-pupil expenditure of \$12,096 (state average \$14,213). The 4-year graduation rate was 90% (state rate 83%). The last time state assessments were administered (2018-19 school year), the site's average pass rates were 74.9% in ELA (59.6% state), 35.4 % in math (48.9% state) and 37.0% in science (46.7% state) (Washington State report card, 2021).

All participants in this study signed participation consent forms (Appendix A). The participants in this study consisted of the members of the staff identified as leaders in some capacity by the site principal. The six research group members consisted of five teachers and one paraeducator; four women and two men; and ranged in experience in education from less than one year to 18 years. Subject areas taught were math, CTE math, art, American Sign Language, and CTE science. The paraeducator had served in a wide range of positions but had specialized as a special education paraeducator in recent years. All findings were coded to anonymize the completed rubrics and maintain confidentiality of the interviews.

Data Collection

The data was collected in four phases, one for each research question. The first phase was collected from the research group and was designed to address the first research question: "How does a complex systems framework alter a school leadership group's understanding of their school as a locus of reform?" These members participated in learning about complex systems theory and the critical systems for reform. Their experiences were captured through the use of pre- and post-survey data regarding their knowledge of complex systems and the five particular school systems being examined, the instructional materials used by the embedded

researcher to instruct the leadership group, and semi-structured interviews completed near the end of the research process. The interviews were delayed until the end of the research process in order to capture the full experience and to least inconvenience the participants. Each interview lasted between 13 and 31 minutes.

The second phase of data collection answered the second research question, “How does collaboratively developing a complex systems assessment tool affect the self-efficacy of a school leadership group with regards to transformative school reform?” The members of the research group used their new understanding of complex systems theory and the five critical systems for reform to write 4-point scaled rubrics with descriptors and examples of evidence to assess the status of their complex school systems. Data collected consisted of the completed rubrics, semi-structured interviews with the participants, and documentation of the school’s CSIP committee’s data collection methods for goal writing for 2 previous years for comparison to the rubrics designed by the research group.

The third phase of data collection answered the third research question: “How does using a complex systems assessment tool to evaluate their school environment affect the self-efficacy of a school leadership group with regards to transformative school reform?” Once the research group completed their rubrics, they were asked to use the rubric individually to score their school on the scales they had designed. The researcher, during this phase, was no longer embedded, so collected the data through copies of the scored rubrics and semi-structured interviews with the research group. The interviews were completed at this stage of the process.

The final phase of data collection addressed the fourth research question: “How does using a complex systems assessment tool to set transformative school goals affect the self-efficacy of a school leadership group with regards to transformative school reform?” Once the

research group had each completed assessing the school using the rubric, they were asked to meet to collectively write one to three transformative school improvement goals. Data collection included completed research group goals, collected historical documents of past CSIP committee goals for comparison, and semi-structured interviews with the research group, completed prior to the completion of this phase. In addition, members were sent copies of their interview transcripts after the goals were written both in order to complete a member check for validation and to offer an opportunity to add comments or feedback regarding the goal-setting process; no further feedback was provided.

Validation of Materials

In order to complete the first two phases of data collection, the researcher developed professional development presentation and rubric design graphic organizer. These materials were examined by dissertation committee members and colleagues in order to check for researcher bias that would inappropriately skew the observational data collected. The professional development presentation materials consisted of a before and after survey regarding the content of the presentation (Appendix B) and a Microsoft PowerPoint presentation (Appendix C). The rubric design graphic organizer is included in Appendix D. The semi-structured interview questions also went through the process of expert validation. Six experts, professionals who had experienced the CSIP process, examined the suggested questions list for the semi-structured interviews. All the questions listed (Appendix E) were found to be valid and aligned to the research questions.

Analytical Methods

The data collected in the semi-structured interviews was recorded, transcribed using the software Otter.ai, the transcripts were hand-checked for accuracy, and then in vivo coding was

applied for analysis. Because the research questions were focused on capturing any potential change in the participants' lived experiences, in vivo coding was chosen in order to most accurately reflect the words and, therefore, experiences of the participants (Marshall & Rossman, 2016; Maxwell, 2013; Saldaña, 2016). Key phrases were sorted by response or topic into a Microsoft Excel spreadsheet. The phrases were then analyzed for codes and the codes in each response or topic were analyzed for themes. The scored rubrics were analyzed for consistency among scorers. While some variation in scoring is expected, large differences in scores were noted to address any potential inconsistencies in the rubrics. The goals written by the research group were also analyzed and compared to the archival CSIP documents collected. The language and committee composition from the historical documents were compared to the research group's documents and composition to determine if the work completed during the study was similar to or different from the work completed in previous years.

Limitations

This study was limited by a single participating site. The next step in this research would be to repeat the participatory process with several more sites with differing demographics, cross-analyze the site-specific rubrics for similarities and differences, and determine if either the process for developing site-specific rubrics is generalizable and sustainable or if the rubrics themselves can be generalized with enough site-specific data. Additional data on effects on school leadership groups' self-efficacy with regards to school reform would also need to be collected during additional site studies in order to determine if this process has potential for creating long-term change in the school improvement process. Longitudinally, following up

with each site that utilizes this process to develop transformative goals to assess the impact of those goals on both the school site and school leaders' self-efficacy would be an additional phase of this research.

Chapter IV

Results

Annual school improvement efforts are not only required by state law in Washington (Supplemental basic education program approval requirements, §2b), but, given the continual decline in student achievement across currently accepted measurement tools systems (Gutierrez & Waitoller, 2017; Kelly, 2008; Lehman, 2015; NCES 2019a; NCES, 2019b), the moral imperative to improve the educational system requires changes to the process of improvement be made. Additionally, the self-efficacy of school leaders, here including not just administrators but any who take a leadership role in the school including teachers, paraeducators, counselors, or any others who might lead reform, is known to be a critical component of effective school organizations (Lazarides et al., 2022; Rockoff, 2004; Tschannen-Moran & Barr, 2004). Finally, complex systems theory, particularly its understanding of inter-related systems operating with feedback loops, emergence and adaptation, and purposeful perturbations, is a viable model for understanding schools and school improvement (Anthony et al., 2013; Clauset & Gaynor, 1982; Crick et al., 2017; Duffy, 2008; Jacobson et al., 2016; Kelly, 2008; Kershner & McQuillan, 2016; Kloos et al., 2019; Mania-Singer, 2017; Mason, 2008a; Morrison, 2008; White & Levin, 2016; Wood & Butt, 2014).

The research gathered here applied a complex systems theory lens to school improvement utilizing a participatory action research model to ask the following research questions:

1. How does a complex systems framework alter a school leadership group's understanding of their school as a locus of reform?
2. How does collaboratively developing a complex systems assessment tool affect the self-efficacy of a school leadership group with regards to transformative school reform?

3. How does using a complex systems assessment tool to evaluate their school environment affect the self-efficacy of a school leadership group with regards to transformative school reform?
4. How does using a complex systems assessment tool to set transformative school goals affect the self-efficacy of a school leadership group with regards to transformative school reform?

The results presented here are gathered from a single research site focused on the work of six school leaders. The data collected consists primarily of semi-structured interview data using a non-rigid set of interview questions (Appendix E). The interviews were conducted in person, recorded using a recording device, and transcribed using Otter.ai. The transcriptions were analyzed using in vivo coding and then organized for themes by topic. Additional data includes archival assessment and goal data from recent years' school improvement plans, general survey data used to determine the effectiveness of the professional development on complex systems theory provided by the embedded researcher to the school leaders (Appendix B, Appendix C), the school improvement rubrics developed independently by the research groups, and the rubric scores and school goals determined by the research group. Results are organized by data type.

Participant profile. The participants in this research were referred to the researcher by the field site's principal. The researcher requested leaders at the school, in any position, who would be willing to participate in approximately seven hours total work spread out over three to four months. While previous participation in the Continuous School Improvement Plan (CSIP) committee did not disqualify participation, it also was not a prerequisite. The site principal referred six participants, five teachers and one paraeducator (Table 1); all agreed to participate in every aspect of the research. School administrators were invited to participate, but all of them

declined. The years of experience in education ranged from less than one year to eighteen years with an average of 9.8 years of professional educational experience. The principal had no further contact with the research materials or research group outside of normal work responsibilities and to provide the researcher with historical CSIP documents for comparison.

Table 1 *Participants*

Participant Pseudonym	Participant's Role	Years in Education
Leader #1	Math teacher	18 years
Leader #2	CTE math teacher	9 years
Leader #3	ASL teacher	12 years
Leader #4	CTE science teacher	>1 year
Leader #5	Art teacher	9 years
Leader #6	Special Education paraeducator	10 years

Archival CSIP Data

The archival CSIP data provided are documents for the 2018-2019 school year and the 2020-2021 school year. The participants listed on the first document are the principal, three assistant principals, the on-time graduation specialist (listed by name), and the department leaders (listed corporately). The participants listed on the second document are just the principal and the assistant principals. Both documents follow a format provided by the district in which the school is located and are organized around three specific goal areas. The first and last goal areas are the same year-to-year (#1 Equity and Social Justice and #3 Increased Student Achievement). 2018-2019 goal 2 is focused on College and Career Readiness and 2020-2021 goal 2 is focused on Attendance and Engagement. Each goal is accompanied by at least one set of Action Steps > Evidence > Resources/Timeline > Individual Commitments listed below the goal. The evidence box, however, is the evidence that will be collected that the goal is being achieved; there is no recording of evidence that led to each goal.

In order to compare like to like, goals 1 and 3 of each document are included here (Table 2). The language of the goals shifts from inclusive pronouns (our, we) to directive language from 2018-2019 to 2020-2021. The change in participants from including staff to exclusively administration might be a factor in this shift. The goals also shift focus from effects on students (passing AP exams, earning credits) to actions of adults (staff skill-set, instructional strategies). All four goals, however, focus on discrete components of school life or minute results. And while the connecting year 2019-2020 data is missing, there is no continuity from one goal to the next to indicate a particular trajectory of change or growth.

Table 2 *Archival Goals*

	2018-2019	2020-2021
Goal 1: Equity and Social Justice	Our Goal is to increase the overall number of passing grades on the AP exam by our AVID and underrepresented students at [redacted] High School. We will take the data with the number of AVID and underrepresented students in AP courses over the past two years, and compare that data with our current AP enrollment.	Increase [redacted] Staff awareness, skill-set, and efficacy in successfully working with students of color, specifically our marginalized black and Hispanic students.
Goal 3: Increased Student Achievement	Our goal is to increase the percentage of students passing their classes and earning credits through the implementation of the CORE-FLEX Program.	Increase student achievement through the implementation of school-wide AVID strategies.

General Survey Data

As part of the professional development provided to the research group by the researcher, a pre- and post-survey was given. The questions on the survey (Appendix B) were identical before and after; the intention of the survey was to first determine any potential pre-knowledge about complex systems theory and the five critical systems that would be utilized in the research

and to determine if there was either an increase or shift in understanding in either of those areas. The survey indicated that prior to the professional development five of the six participants had not heard of systems theory or complex systems theory. The one participant who indicated prior knowledge explained in the open-answer follow-up that systems theory or complex systems theory is “something about the interaction of different systems?” While this is not incorrect, it is a rudimentary and insecure understanding of the terms. In the post-survey, all six respondents were able to give a more secure definition of systems theory/complex systems theory, including references to adaptation, feedback loops, disequilibrium, and boundaries.

When asked on the pre-survey about the individual systems, many responses were “not certain,” “I’m not sure what you mean,” or “I have no idea what that means.” Many of the attempted descriptions are fairly limited in scope and definition. For example, the descriptions of the leadership system on the pre-survey exclusively describe the administrative team of principal and assistant principals. The one exception to this is one respondent who indicated that staff can bring their questions to department chairs and then department chairs have access to the administrators who are the leaders. The post-survey responses provide richer descriptions of each of the five systems. The descriptions of the leadership system shift away from a focus on how the administration is structured and behaves and includes more descriptors of student and staff leadership and ways that it can improve. One respondent on the post-survey went so far as to describe leadership as “Leveled system with administrators at the top, students at the bottom and all staff in between. All that walk through the halls and classes have the capability of being leaders through their actions and words and is encouraged to ask questions and lead through example with their peers.” This idea of both level leadership and individual responsibility for leadership was not evident in the initial responses to the identical survey.

Rubrics Developed by Research Participants

After engaging in researcher designed and provided professional development (Appendix C), the six research participants were instructed to meet as a group independent of the researcher to develop rubrics to assess their site. The researcher provided a blank graphic organizer which gridded the five systems on a scoring scale of Needs Improvement, Basic, Proficient, and Distinguished. Each system was also set up to be scored in reference to each of the other four systems on the same scoring scale. All definitions of what was included in each system and how each system was rated was left blank to be determined by the research group. Only the systems and the rating scale were named. Over the course of a month after the professional development, the six participants worked both independently and as a group to develop a rubric to assess their site (Table 3).

The full rubrics have been included here for examination as their production is a critical piece of data in this research. However, here are some highlights from their text. Throughout their production, a consideration of the interconnectivity of actions in a school is considered, not just when the research participants were directly asked to consider the interconnectivity on their rating scales. For example, the first item under Proficient for Instructional Guidance System reads “Curriculum built for most students for an equitable delivery to all learning styles.” Taken in a complex systems theory lens, this item is not just assessing the Instructional Guidance System independently but is understanding its quality in relationship to being student-centered (another critical system). Looking at just that same line across the four categories from needs improvement to distinguished, all the language is focused on curriculum and diversity of learning styles. The consistency of this language provides more clear feedback to a goal-writing team that could then, if the evidence warrants it, write goals based on curriculum delivery to a

diversity of learning styles supported by the evidence in the rubrics. Similarly, the primary scoring line for “Leadership that Drives Change” includes marks for whether or not student voice is included in the overall leadership system, an explicit integration of “Student-Centered Learning Climate” into another system. This also ensures that the goal-writing team is scoring and planning systemically rather than in a siloed fashion. Looking through each line of the rubrics, the categories are similarly aligned throughout.

Table 3 Participant Created Rubrics

Comprehensive School Systems Assessment Rubric

	Needs Improvement	Basic	Proficient	Distinguished
Instructional Guidance System: consider a description of what this includes or a brief definition Teachers, Students Curriculum, Materials, Space/Facility, Creature Needs, Trust, Leadership	Curriculum focused on specific students and learning styles. Occasionally safe environment that students feel comfortable in with the instruction given. Few students are well rested and prepared for learning in a <u>classroom</u> <u>with</u> little to no accommodations for individual learners. Teachers are not compensated for any time outside of the classroom/contracted day.	Curriculum built for some students and some learning styles. A mostly safe environment that students feel comfortable with the instruction given. Some students are well rested and prepared for instruction in a classroom with few modifications for individual learners. Teachers are occasionally compensated for their time outside of the contracted day.	Curriculum built for most students for an equitable delivery to all learning styles. A moderately safe environment that most students feel comfortable with the instruction being delivered. Most students are well rested and prepared for instruction in a classroom that allows for mostly clear accommodations/modifications for individual learners. Teachers are mostly fairly compensated for <u>extra curricular activities</u> , and allowed extra time to meet with specific needs of students in SPED classes, extra time for Clubs/Committees.	Perfectly Built Curriculum for all students for an equitable deliverance to all independent & diverse learners across the board. A safe environment where all students feel comfortable for the instruction being delivered. All students are well-rested/well-accustomed and prepared for instruction each day in a classroom that allows for clear accommodations/modifications across the board for each individual learner. Teachers are fairly and equally compensated for extra/intra-curricular activities may it be compensation directly, or paid days to plan with a substitute teacher to direct classes and allow for time to catch up based on Special Education Overload, Class Overload, or Club/Committee Overload. All fairly accommodated <u>off</u> of time schedules and district set rules and regulations.
...In relationship to Professional Capacity	Teachers include in their curriculum and class instruction accommodations when necessary. Varying forms of material provided <u>if and when</u> available. Pull-out support with interpreter based on availability.	Teachers include in their curriculum and class instruction accommodations and varying forms of material based on availability. Teachers will allow for pull-out support with interpreter based on availability.	Teachers include in their curriculum and class instruction accommodations, access to interpreters for various language based on availability, varying forms of student material access based on availability, community application based on in-class curriculum.	Teachers automatically include in their curriculum and classroom instruction accommodations, access to interpreters for various languages, varying forms/platforms for student material access, along with community application based <u>off of their in-class curriculum</u> .
...In relationship to Parent-Community-School Ties	Little to no updates regarding course progress. Increased confusion of students and families.	TAC newsletter, with a Schoology update for each course centered on IPR's.	Monthly TAC newsletter, with a monthly Schoology update for each course.	Monthly TAC newsletter, with a weekly Schoology update for each course. Along with a proper link for attendance to be relevant to their student's workload.

... In relationship to Student-Centered Learning Climate	Limited curriculum and class instruction accommodations. Limited forms of material provided if available. Pull-out support with interpreter based on availability.	Teachers include in their curriculum and class instruction accommodations and varying forms of material based on availability. Teachers will allow for pull-out support with interpreter based on availability.	Teachers include in their curriculum and class instruction accommodations, access to interpreters for various language based on availability, varying forms of student material access based on availability, community application based on in-class curriculum.	Teachers automatically include in their curriculum and classroom instruction accommodations, access to interpreters for various languages, varying forms/platforms for student material access, along with community application based off of their in class curriculum.
... In relationship to Leadership that Drives Change	Few staff members at varying levels of the building buy into consistently adjusting instruction to meet student needs.	Several staff members at all levels of the building buy into consistently adjusting instruction to meet student need.	Many staff members at all levels of the building buy into consistently adjusting instruction to meet student need.	Staff members at all levels of the building buy into consistently adjusting instruction to meet student need.

	Needs Improvement	Basic	Proficient	Distinguished
Professional Capacity: consider a description of what this includes or a brief definition In short: each staff member's ability to do their job. Teacher's education/experience, Teacher access to materials and curriculum, Teacher growth, Teacher Diversity, Family & Community Support	Teachers can use work/life experience in place of education. Some teachers must create their own comprehensive curriculum AND the scaffolded materials for it. Teachers must find and complete professional development on their own, uncompensated time. Most teachers have a plan period, most of the time. There are enough support staff to assist in most, but not all, of the classrooms with the highest need.	Teachers have some education and access to a curriculum that meets current state <u>standards</u> , but requires the teacher to create scaffolded material. Teachers must complete the offered professional development on their own time. Teachers have a plan period. There are enough support staff to support classrooms with the highest need only.	Teachers have required education and access to curriculum with 2-3 levels. Teachers are given access to paid professional development to pursue on their own time. Teachers have a plan period and some PLC time. There are enough support staff to serve each classroom in need, with some collaboration time allotted for teacher-para planning.	Teachers enter with the education they need, along with full access to all levels of curriculum that is required and/or recommended. Time and opportunity is given to support teacher growth and development in and out of the classroom. True, ample planning time, 'duty-free' and compensated for. Effective support staff along with proper maintenance of time schedules that allow for relationships directly between the teachers and paraeducators to build strong connections with the educators in the room along with the students as well.
...In relationship to Instructional Guidance System	Few teacher spots are filled with master-level experience/education. Few teachers have a dedicated classroom space that provides the proper learning environment. The HVAC, plumbing, internet, and	Some teacher spots are filled with master-level experience/education. Some teachers have access to a dedicated classroom space with proper environment, some are roaming or have incomplete classrooms.	Most teacher spots filled with master-level experience/education. Most teachers have a dedicated classroom space with proper environment (like sinks, lab space, technology, etc.) for learning. HVAC,	Every Teacher spot filled with master level experience and level of education, along with the proper environment for learning to provide the most amount of opportunity.

	communication systems are unreliable and unpredictable.	There are some problems with 1-2 of the HVAC, plumbing, internet, communication systems sometimes or during certain seasons.	plumbing, internet infrastructure, and communication systems work a majority of the time.	
...In relationship to Parent-Community-School Ties	Grades, attendance, communication, and school information all exists on separate platforms that require separate logins, resulting in confusion and miscommunication between teachers and families.	More than one system exists for communication, resulting in complicated and ineffective use by both teachers and families.	Access to a streamlined system for contact between teachers and <u>families</u> , but is inefficient or complicated to use.	Access to a streamlined, updated system to 2-sided contact between parents efficiently and effectively to allow for simple and beneficial use.

...In relationship to Student-Centered Learning Climate	Educators placed as needed, curriculum limited to materials available.	Educators that are student centered and encouraging around many forms of diversity with curriculum that includes some diversity	Educators that are student centered and encouraging around many forms and levels of diversity with curriculum that reflects that diversity.	Educators that are student centered and encouraging around all forms and levels of diversity with curriculum that reflects that diversity.
... In relationship to Leadership that Drives Change	Administration functions separately from staff and builds relationships with certain students in instances of discipline or recognition only.	Administration partners with staff upon request and builds relationships with certain groups of students.	Administration actively partners with staff and builds relationships with students outside of the classroom.	Administration that is partnered with staff members that provide opportunities for Administration to build relationships with students through beneficial time in the classroom at points throughout the week.

	Needs Improvement	Basic	Proficient	Distinguished
Parent-Community-School Ties: consider a description of what this includes or a brief definition Beneficial but not overbearing. Communication is Consistent and Efficient, Positive working relationship/environment, not adversarial, assume positive intent	Community and Family involvement is lacking due to decreased communication. Inconsistent or unclear communication with district/admin. and teachers. Increase in Parent/Guardian concerns leaving family to feel helpless in how to help students	Fundamental communication is provided from both ends along with District/Admin support to provide opportunities. Some parent/guardian involvement in extracurricular activities.	Family and school staff work together regularly and support students' needs. Clear and consistent communication is provided from both ends along with District/Admin support to provide all opportunities available, not leaving them hidden on a website. Afterschool activities/clubs have transparent information shared along with accurate attendance to allow parents security in thought as to where their student(s) are at when involved in relation to their school, after hours.	Family and School staff have a relationship built off of trust due to a positive intent from both ends. Clear and consistent communication is provided from both ends along with District/Admin support to provide all opportunities available, not leaving them hidden on a website. Afterschool activities/clubs have transparent information shared along with accurate attendance to allow parents security in thought as to where their student(s) are at when involved in relation to their school, after hours.
...In relationship to Instructional Guidance System	Little to no updates regarding course progress. Increased confusion of students and families.	TAC newsletter, with a Schoology update for each course centered on IPR's.	Monthly TAC newsletter, with a monthly Schoology update for each course.	Monthly TAC newsletter, with a weekly Schoology update for each course. Along with a proper link for attendance to be relevant to their student's workload.
...In relationship to Professional Capacity	Grades, attendance, communication, and school information all exists on separate platforms that require separate logins, resulting in confusion and miscommunication between teachers and families.	More than one system exists for communication, resulting in complicated and ineffective use by both teachers and families.	Access to a streamlined system for contact between teachers and families, but is inefficient or complicated to use.	Access to a streamlined, updated system to 2-sided contact between parents efficiently and effectively to allow for simple and beneficial use.

...In relationship to Student-Centered Learning Climate	Inadequate or no access to student progress on digital tools, little to no communication and credit tracking.	Effective connections that allow students and families to track course progress.	Clear and concise connections to student progress allowing students to feel empowered. Parent/Guardians and students have access to tools to help track progress in courses and make plans for future pathways.	High quality, streamlined access with clear and concise connections to student progress on digital tools to assist parents in open communication and credit tracking, pathway progress, and all other HSBP components
... In relationship to Leadership that Drives Change	Lacking guidance and/or organization that excludes either students, teachers, or family input. Limited or absent communication causing confusion or exclusion.	Adequate leadership that allows clear communication and guidance.	Open communication and organization from leadership roles that has the students' best interests at heart of policy and communication.	Decision-making and leadership response is there that values student, teacher and parent voice/input. Transparent direction as to where and how to do so.

	Needs Improvement	Basic	Proficient	Distinguished
Student-Centered Learning Climate: consider a description of what this includes or a brief definition Accommodation/Differentiation Different forms of Comm. Sleeping & Eating Bathroom Identity Temps in room Embracing interest Honoring pronouns, names Learning & Applying skills Incorporating the community Field trips Individualized assessment "PBL"	Students are unaccounted for. Needs will be met if staff is made aware and if services are available. Limited communication to allow parents to be aware of behaviors and failing grades. Students address by name provided by parent/guardian. Facilities are gender based. Education is provided to meet graduation requirements.	Students' basic needs will be evaluate met on a case-by-case basis provided services are available. Contact home if conditions occur regularly to provide resources. Students are provided assignments/communication in <u>most commonly used</u> home-languages to allow parents to be aware of student's progress and needs in classroom. Parents may request communication be translated if home language not readily available. Students are addressed with proper pronouns and proper pronunciation of names. Facilities designated to available locations. Students can see themselves using their education in future careers.	All students provided for that are coming in deficient in basic needs through supplemental programs offered in-school. Students are provided assignments/communication in <u>most commonly used</u> home-languages to allow parents to be aware and alerted of their student's progress needs in classroom. Resources will be provided for information to be translated. Students are addressed with proper pronouns and proper pronunciation of names. Information will be provided for substitutes. Safe facilities available for all students in respect to gender. Students can see themselves using their education in their future careers and their identity as to who they are and who they will be.	Student need trumps all! All students provided for that are coming in deficient in their basic needs through supplemental programs offered in-school. Students are provided assignments/communication in their home-language to allow for parents to be aware and alert on their student's needs in the classroom. Students are addressed with proper pronouns and proper pronunciation of names. Information will be provided for substitutes. Safe facilities available for all students in respect to gender. Students can see themselves using their education in the future to help in careers, their identity as to who they are/will be, along with impact in their community they settle into post-high.

...In relationship to Instructional Guidance System	Limited curriculum and class instruction accommodations. Limited forms of material provided if available. Pull-out support with interpreter based on availability.	Teachers include in their curriculum and class instruction accommodations and varying forms of material based on availability. Teachers will allow for pull-out support with interpreter based on availability.	Teachers include in their curriculum and class instruction accommodations, access to interpreters for various language based on availability, varying forms of student material access based on availability, community application based on in-class curriculum.	Teachers automatically include in their curriculum and classroom instruction accommodations, access to interpreters for various languages, varying forms/platforms for student material access, along with community application based off of their <u>in class</u> curriculum.
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...In relationship to Professional Capacity	Educators placed as needed, curriculum limited to materials available.	Educators that are student centered and encouraging around many forms of diversity with curriculum that includes some diversity.	Educators that are student centered and encouraging around many forms and levels of diversity with curriculum that reflects that diversity.	Educators that are student centered and encouraging around all forms and levels of diversity with curriculum that reflects that diversity.
...In relationship to Parent-Community-School Ties	Inadequate or no access to student progress on digital tools, little to no communication and credit tracking.	Access with clear connections to student progress on digital tools to assist parents in open communication and credit tracking, pathway progress, and all other HSBP components.	High quality access with clear and concise connections to student progress on digital tools to assist parents in open communication and credit tracking, pathway progress, and all other HSBP components.	High quality, streamlined access with clear and concise connections to student progress on digital tools to assist parents in open communication and credit tracking, pathway progress, and all other HSBP components
... In relationship to Leadership that Drives Change	Elected students of one group/council led by advisor.	Responsibility is spread evenly among all students/student groups paired with an advisor that directs through leadership.	Responsibility is spread evenly among all students/student groups paired with an advisor that resonates and directs through leadership in action with respect to diversity.	Responsibility is spread evenly among all Students/Student Groups who are paired with an advisor that resonates and directs through leadership in action. Student leadership is equitable in their diversity among their peers, a true reflection.

	Needs Improvement	Basic	Proficient	Distinguished
Leadership that Drives Change: consider a description of what this includes or a brief definition Leveled out Students Every Staff Member Administrators PTSO Members Parents "Student-Driven Leadership"	Few levels have input in the <u>decision making</u> process. Administration allows meetings of diverse minds. Certificated & Classified Staff think recommendations from observations that reach past the walls of their classroom along with within. Students offer positive change suggestions. Leadership responsibilities are shared for an attempt at equitable impact on all diverse backgrounds for proper representation.	Several levels have input in the <u>decision making</u> process. Administration organizes meetings that allow for meetings of diverse minds, to attempt to build equitable education within the walls of the school. Certificated & Classified Staff <u>tell</u> another staff member recommendations from observations that reach past the walls of their classroom along with within. Students offer positive change suggestions and sometimes allow for failures to be built <u>off of</u> . Leadership responsibilities are shared for a basic equitable impact on all diverse backgrounds for proper representation.	Most levels have input in the <u>decision making</u> process. Administration organizes meetings that allow for meetings of diverse minds, to build equitable education within the walls of the school. Certificated & Classified Staff make recommendations from observations that reach past the walls of their classroom along with within. Students offer positive change suggestions and moderately allow for failures to be built <u>off of</u> . Leadership responsibilities are shared for an almost equitable impact on all diverse backgrounds for proper representation.	Every Level has input in the <u>decision making</u> process. Administration actively organizes meetings and regulations that allow for proper meetings of the diverse minds that allows for them to create the proper 'schematics' to build equitable education between the walls within the school. Certified & Classified Staff are empowered to make recommendations from observations that reach past the walls of their classroom along with within. Students are empowered to drive positive change and take risks in doing so, allowing for failure that is taught to be built <u>off of</u> . Leadership responsibilities is equally shared for an equitable impact on all diverse backgrounds for proper representation.
...In relationship to Instructional Guidance System	Few staff members at varying levels of the building buy into consistently adjusting instruction to meet student needs.	Several staff members at all levels of the building buy into consistently adjusting instruction to meet student need.	Many staff members at all levels of the building buy into consistently adjusting instruction to meet student need.	Staff members at all levels of the building buy into consistently adjusting instruction to meet student need.

... In relationship to Professional Capacity	Administration functions separately from staff and builds relationships with certain students in instances of discipline or recognition only.	Administration partners with staff upon request and builds relationships with certain groups of students.	Administration actively partners with staff and builds relationships with students outside of the classroom.	Administration that is partnered with staff members that provide opportunities for Administration to build relationships with students through beneficial time in the classroom at points throughout the week.
... In relationship to Parent-Community-School Ties	Elected students of one group/council led by advisor.	Adequate leadership that allows clear communication and guidance.	Open communication and organization from leadership roles that has the students' best interests at heart of policy and communication.	Decision-making and leadership response is there that values student, teacher and parent voice/input. Transparent direction as to where and how to do so.
... In relationship to Student-Centered Learning Climate	Responsibility is spread evenly among elected students paired with an advisor that directs through leadership.	Responsibility is spread evenly among all students/student groups paired with an advisor that directs through leadership.	Responsibility is spread evenly among all students/student groups paired with an advisor that resonates and directs through leadership in action with respect to diversity.	Responsibility is spread evenly among all Students/Student Groups who are paired with an advisor that resonates and directs through leadership in action. Student leadership is equitable in their diversity among their peers, a true reflection.

Rubric Scores and School Goals Set by Research Participants

Once the research group had written the rubrics, they were then tasked with completing the CSIP process: assessing the school site and writing goals for the year. Looking at the scores for the overall categories each of them submitted, there are a few outliers, but most of them are generally aligned (Table 4).

Table 4 *Participant Overall Rubric Scores*

Overall Score						
	Leader #1	Leader #2	Leader #3	Leader #4	Leader #5	Leader #6
Instructional guidance system	Basic	Basic	Basic	Proficient	Proficient	Basic+
Professional capacity	Proficient	Basic	Basic	Proficient	Proficient	Basic
Parent-School-Community ties	Proficient	Needs Improvement	Proficient	Proficient	Basic	Needs Improvement
Student-centered learning climate	Needs Improvement	Needs Improvement	Proficient	Basic	Basic	Basic
Leadership that drives change	Needs Improvement	Proficient	Basic	Proficient	Basic+	Basic

While all of them are invested as both employees of the school and described as leaders by the principal, their scoring does not appear to show evidence of inflation. On the contrary, very few proficient scores were awarded and most areas scored overall as Basic, some with two marks of Needs Improvement. Student-centered learning climate and Leadership that drives change scored particularly low by the research group.

Looking at the assessment of the systems in relationship to each other, the scores remain consistent and consistently low (Tables 5, 6, 7, 8, and 9). The highest marks with the most Proficient scores are in the Leadership that drives change system, particularly in relationship to the Instructional guidance system and Parent-School-Community ties. Interestingly, in comparison, the most consistently low scores are in the Parent-School-Community ties, even in relationship to Leadership that drives change. While the overall scores might have sent goal

writing in the direction of Leadership that drives change, digging deeper into the connections between systems highlights some more particular areas of need.

Table 5 *Participant Cross-Referenced Scores for Instructional Guidance System*

Instructional guidance system in relation to....						
	Leader #1	Leader #2	Leader #3	Leader #4	Leader #5	Leader #6
Professional capacity	Proficient	Basic	Basic	Proficient	Basic	Basic
Parent-School-Community ties	Needs Improvement	Basic	Needs Improvement	Proficient	Basic	Basic
Student-centered learning climate	Basic	Basic	Basic	Proficient	Basic	Basic
Leadership that drives change	Proficient	Basic	Basic	Proficient	Proficient	Proficient

Table 6 *Participant Cross-Referenced Scores for Professional Capacity*

Professional capacity in relation to...						
	Leader #1	Leader #2	Leader #3	Leader #4	Leader #5	Leader #6
Instructional guidance system	Basic	Basic	Basic	Proficient	Basic	Basic+
Parent-School-Community ties	Basic	Basic	Basic	Basic	Basic	Needs Improvement
Student-centered learning climate	Basic	Basic	Basic	Proficient	Basic+	Basic
Leadership that drives change	Proficient	Basic	Basic	Proficient	Basic	Proficient

Table 7 Participant Cross-Referenced Scores for Parent-School-Community Ties

Parent-School-Community ties in relation to....						
	Leader #1	Leader #2	Leader #3	Leader #4	Leader #5	Leader #6
Instructional guidance system	Needs Improvement	Needs Improvement	Needs Improvement	Proficient	Basic	Basic
Professional capacity	Basic	Needs Improvement	Basic	Basic	Basic	Needs Improvement
Student-centered learning climate	Proficient	Needs Improvement	Proficient	Proficient	Basic	Needs Improvement
Leadership that drives change	Needs Improvement	Needs Improvement	Needs Improvement	Proficient	Basic+	Proficient

Table 8 Participant Cross-Referenced Scores for Student-Centered Learning Climate

Student-centered learning climate in relation to...						
	Leader #1	Leader #2	Leader #3	Leader #4	Leader #5	Leader #6
Instructional guidance system	Proficient	Needs Improvement	Basic	Proficient	Basic	Basic
Professional capacity	Basic	Needs Improvement	Basic	Proficient	Basic+	Basic
Parent-School-Community ties	Proficient	Needs Improvement	Proficient	Basic	Basic	Needs Improvement
Leadership that drives change	Basic	Needs Improvement	Needs Improvement	Basic	Basic	Needs Improvement

Table 9 *Participant Cross-Referenced Scores for Leadership that Drives Change*

Leadership that drives change in relation to....						
	Leader #1	Leader #2	Leader #3	Leader #4	Leader #5	Leader #6
Instructional guidance system	Proficient	Proficient	Basic	Proficient	Proficient	Basic+
Professional capacity	Basic	Proficient	Basic	Proficient	Basic	Basic+
Parent-School-Community ties	Basic	Proficient	Proficient	Proficient	Proficient	Proficient
Student-centered learning climate	Basic	Proficient	Needs Improvement	Basic	Basic	Proficient

The final task the research group was asked to complete was to utilize the scores they had set for the site to write school goals for the year, essentially, to complete the last step of the CSIP process. In setting their goals, the group set two overall goals and one specific target. In the short-term, the group set a goal to move up one rank in each score on the rubric by the end of the 2022-2023 school year. The second goal the group set expands both the timeline and the impact of their work. They set a goal of including the rest of the staff at the site in the learning and rubrics that they've built and working as a whole staff to move every category to proficient by the end of the 2023-2024 school year. In their words, they wrote this goal "assuming we begin work as a staff second semester and are relatively taking baby steps." The more specific target identified Parent-School-Community ties as a particular area of weakness and sought to strengthen this area in relationship to an upcoming policy change. The group knows that the site is going to attempt to implement a more rigorous cell phone policy second semester of the 2022-2023 school year. They both anticipate an increase in home communication and recognize that

this is a system that is generally weak. Noting this, the research group suggested a tiered response for contacting home, including a proposal that the learning management system be modified to streamline or automate this communication as an indicator of a Distinguished rating.

Interview Data

The final set of data come from semi-structured interviews completed with each member of the research group individually. These interviews were completed after the rubrics were designed, the members had begun scoring, but before the goals had been set. The interviews took place at this point in the research in order to better capture the participants' impressions of the rubric-writing and scoring process, the bulk of the work. Members had an opportunity to add feedback regarding goal-writing during member-checking of the interview transcripts, but no further impressions were offered. Each interview lasted between 13 minutes and 31 minutes. They were conducted in person, recorded to mp3s, and transcribed after the fact using Otter.ai transcription software. After transcribing, in vivo coding methodology was used to identify codes and themes. Because the interviews were completed in a semi-structured rather than a completely structured format, the questions in each interview were not identical but generally addressed the same topics. The research questions were focused on capturing any potential change in the participants' lived experiences, in vivo coding was chosen in order to most accurately reflect the words and, therefore, experiences of the participants (Marshall & Rossman, 2016; Maxwell, 2013; Saldaña, 2016). Responses were grouped by the general topics and then coded and themed by topic rather than large, overall themes. The topics that were analyzed were the members' overall impressions of the process; their thoughts about complex systems theory, especially as it relates to schools and school improvement; comparing this research process to their understanding of their site's usual CSIP process; and their understanding of their own

personal role in school improvement after having participated in this research. The themes and highlights for each of these topics are discussed below.

Overall Impressions of the Process

In order to understand the research group's impressions of the process, the interviews included questions about their general feelings about the experience, what they thought was the most important learning, and both what they are excited for and their pragmatic expectations for the work moving forward. Out of fourteen comments related to their feelings about the process, two themes emerged most strongly: collaboration and actionable. Two of the six participants highlighted the opportunity to work with a diverse group of educators that they normally would not collaborate with, while three of the six highlighted the immediate applicability and actionable work that arose from this process. While not spoken of as strongly, two participants also mentioned leadership and one participant highlighted that the process was a more holistic view of the school. The theme of the work being actionable also came through strongly as an important learning with three of the six participants mentioning this as significant (Table 10).

Table 10 *Themes Regarding the Overall Process*

Participant	Response	Theme
Leader #1	...collaborating...	Collaboration
	...separated by departments...	Collaboration
	...hearing how other people...	Collaboration
Leader #3	...it was nice to work with everybody...	Collaboration
	...we're an eclectic group...	Collaboration
Leader #1	And I liked analyzing what makes what defines school culture...	Actionable
Leader #2	...immediately thought this would be such a powerful professional development or such powerful building development...	Actionable
	...this would be so much more powerful, because there's specific goals attached to it.	Actionable

Leader #4	...is kind of a really hands on way of trying to do what the district is trying to preach with their cultivating equitable educators...	Actionable
	...the application of things...	Actionable
	...how to alter their minds to have an equitable input on what they learn in an output on what they speak. And they teach, I guess, it's a good way to look at it. And this is a good way to assess it.	Actionable

When asked about important learning, two more themes that become more significant throughout later responses also appear: buy-in (in reference to staff outside of the research group) and efficacy. In both expectations and hope, buy-in and efficacy are also the strongest themes. While three members did express concerns that they had set too idealistic expectations on the rubrics they designed, four members expressed concern that staff beyond the research group would not buy-into the use of the rubrics. One member stated, “We really struggle with making lasting meaningful changes” (Leader #1). Despite the concern that other staff members might not be willing to take up the work, four of the six members of the research group stated that they themselves were excited to create change. In describing this sense of efficacy, one member stated, “I would hope that some of that would kind of permeate into other staff members...we get kind of pumped about it” (Leader #3). Another stated, “If I can’t go above my level, at least hold myself to it. And then branch out from there” (Leader #4). This feeling carried through into them seeing the potential for the rubrics even if the staff does not adopt them. One member stated, “I really hope that we can start as our small group and look at the proficient and the distinguished and really go, okay, what can we do? What proposals can we make?” (Leader #6). Similarly, Leader #3 stated, “I don’t like being a basic teacher. I don’t like teaching at a basic school. Like I want to change it!” Even more explicitly, Leader #2 stated,

“This rubric would increase my efficacy” if it were to become part of the regular CSIP process (Table 11).

Table 11 *Themes Regarding Important Learning*

Participant	Response	Theme
Leader #1	...that really it would create a lot of change...	Buy-in
	...that we really struggle with making lasting meaningful changes...	Buy-in
	I don't see a lot of teamwork ...	Buy-in
Leader #3	...it really does come down to the staff wanting things to work...	Buy-in
	...no policy that we create is going to work unless staff are on board...	Buy-in
	I think some will. I think some won't	Buy-in
Leader #1	So I think it just kind of made me hopeful...	Efficacy
	I would be someone that could talk to others...	Efficacy
	I could be someone that kind of is a leader...	Efficacy
	...it'd be cool to have a committee that's, you know, like I said, all the levels like students, classified staff, teachers, admin counselors...	Efficacy
Leader #2	...my hope is just that it helps my personal teaching...	Efficacy
	...like I definitely need to find a new way to communicate with parents and families...	Efficacy
	...this rubric would increase my efficacy...	Efficacy
	...then there's there's pressure on me, there's already that buy in to help make sure it happens to encourage my department members and my friends on staff to make sure it's happening...	Efficacy
	...it makes it more pressure on me to show up.	Efficacy
Leader #3	I would hope that some of that would kind of permeate into other staff members...we get kind of pumped about it...	Efficacy
	I see less of it on the admins shoulders...	Efficacy
	And it really does depend on the staff...	Efficacy
	Well, how about we just decide, and we go to [the principal] and say, This is what we want,...	Efficacy
	Because I now view him more as a support role versus a dictator role...	Efficacy
	After doing this, I feel like I have more of a role...	Efficacy
	Because now I see. If they are in fact entwined, which it sounds like they are, I can see the benefit of more teachers voices than less like before...	Efficacy

Leader #4	...if I can't go above my level, at least hold myself to it. And then branch out from there...	Efficacy
	I have two classrooms next to me, I can help them out...	Efficacy
	...hopefully, it's just infectious...	Efficacy
	Everyone always says top down, you have to start from the bottom up...	Efficacy
	[What would you say is the role of the teacher in school reform?]So huge because they're the frontline workers...They're the ones working with the kids. And you start with the kids...	Efficacy
Leader #5	I'm most excited to see how it applies to our community here at [redacted], and how we can use this to kind of help improve our school culture...	Efficacy
Leader #6	I am excited to try to create change...	Efficacy
	...because I think that there are some really good ideas in here and I see what we're doing but I do see where we need to go and I believe that we can get there...	Efficacy
	I really hope that we can start as our small group and look at the proficient and the distinguished and really go, okay, what can we do? What proposals can we make...	Efficacy

Thoughts About Complex Systems Theory

The participants were asked to provide their opinions about complex systems theory as a way of thinking about schools and about school reform. Two themes emerged very strongly in their responses: they consider complex systems theory to be a valid and holistic framework for understanding schools and school reform. Five participants described complex systems theory as valid. Their responses include statements such as “[complex systems theory] makes sense and is valid in my mind...I think that’s the way that we need to look at it” (Leader #1), “it’s very useful because of the common language” (Leader #2), and “you got to break down every aspect of everything” (Leader #4). These five respondents indicated that they had adopted a complex systems theory understanding of both schools and school reform as a valid lens for interpreting their experience as educators.

Additionally, four participants found complex systems theory to be a holistic approach to schools and school reform. Leader #2 emphasized the theory's ability to provide a common language to connect differing perspectives saying that it "gives us a common language...it's something everyone can access." She continued, regarding the theory's effectiveness for understanding reform in particular, that "it delineates everything out to where you have to think about each perspective." Leader #5 reflected on complex system theory's usefulness for understanding reform that "looking at...each component and how...each one affects each other? I think that's, yeah, definitely more...effective." Leader #6 reflected that her new knowledge of complex systems theory had her "looking at things differently, more as a whole. What is the whole picture here? What is the whole story?" These leaders valued the holistic lens that complex systems theory gave them for understanding their observations of their school's practices (Table 12).

Table 12 *Themes Regarding Complex Systems Theory*

Participant	Response	Theme
Leader #1	...it makes sense and is valid in my mind.	Valid
	I think that's the way that we need to look at it...	Valid
Leader #2	I think it's a great one to use to define it, it makes a lot of sense...	Valid
	...it's very useful because of the common language...	Valid
Leader #3	My understanding of schools is not at all the same.	Valid
Leader #4	...you got to break down every aspect of everything...	Valid
Leader #2	...also maybe see different perspectives...	Holistic
	...helpful for community members and politicians...	Holistic
	...give us a common language...	Holistic
	...it's something everyone can access...	Holistic
Leader #4	Oh, yeah. 100%. I mean, gotta break down every aspect...	Holistic

Leader #5	I think it's a more rounded creates a more rounded viewpoint...	Holistic
	Looking at, again, each each component and how it's how each one affects each other? I think that's, yeah, definitely more more effective...	Holistic
Leader #6	I am looking at things differently, more as a whole. What is the whole picture here? What is the whole story?	Holistic

Comparison to CSIP Process

Five of the six participants were asked to compare this process to the school's usual CSIP process. The sixth participant was in his first year of teaching at the site so would have had no basis for comparison. Four of the five respondents described the usual process of school improvement as an exclusive endeavor. Leader #6 went so far as to say "I thought CSIP was just at the elementaries." Leader #5 responded "just being aware that there is an actual group that actually discusses this and meets. I think that's step one." Only Leader #2 indicated that she had some level of knowledge of the usual process, but even then she described that knowledge by saying she was "pretty lucky to have more of an inner view and participation of that." The responses of all five of these participants indicate that the current practice has limited participation, does not have a wide dispersal or sharing of goals, and does not have a significant impact on their daily practice as educators.

Conversely, when asked how the process the research group was asked to undertake compares to the usual process, all five respondents described the research process as inclusive. Leader #2, who has had experience with the school's CSIP process, stated that the research process was "way more inclusive than the CSIP process" and that it "improved staff to staff communication." Leader #3 said "I don't see [the usual CSIP] process. So this just feels much more inclusive." Leader #6 expressed a desire for the process to become more inclusive, sharing

“I don’t know how many people know that there is a CSIP. Or there should be a CSIP. It has to, though, it has to change. It has to, we have to...change our goals, too.” Similarly, Leader #1 expressed a hope that this process could be a framework for more inclusive CSIP work, saying “I would like it to be something that the school community as a whole can buy into action” (Table 13)

Table 13 *Themes Regarding the CSIP Process*

Participant	Response	Theme
Leader #1	I've never heard of a CSIP committee until you told us about it...	Exclusive
Leader #2	I think I'm pretty lucky to have more of an inner view and participation of that...	Exclusive
Leader #3	I know, we went through it like, a couple years ago, it feels like or maybe we go through it every year? I don't know...	Exclusive
	...don't ask me what it was because I don't remember.	Exclusive
Leader #5	...just being aware that there is an actual group that that actually discusses this and meets. I think that's step one...	Exclusive
	...I definitely would like to learn more about it, that whole process...	Exclusive
	...I don't really feel like there's a wide sort of participation in CSIP.	Exclusive
Leader #6	I thought CSIP was just at the elementaries...	Exclusive
	...that was supposed to be at all schools. And I did not even know...	Exclusive
Leader #1	I would like it to be something that the school community as a whole can buy into action.	Inclusive

Leader #2	I think this plays right into that, because it expands that even further. And gives give stuff like, let's make sure in June, we have at least the basic going in, right, let's aim for proficient in our planning, and then how do we get the staff to help us when we all meet in August together and get that distinguished part and get kind of everyone on board and everyone's voice in there instead of just the couple people	Inclusive
	...way more inclusive than the CSIP process...	Inclusive
	..improved staff to staff communication...	Inclusive
	...one of the biggest complaints I've heard from my peers and colleagues is they don't feel their voices heard, sometimes on a building level, but definitely on a district level. And I think, by definition, this would include their voice...	Inclusive
	They know that they've given that feedback...	Inclusive
Leader #3	I feel like even just opening it up to how many of us are in the group six, six, even just opening it up to six more people like I have been introduced to the math perspective, science and different perspectives from the school that I never was a part of before.	Inclusive
	I think it's just more inclusive this way...	Inclusive
	I don't know, because I don't see that process. So this just feels much more inclusive...	Inclusive
Leader #5	[if this process of using these rubrics or using these rubrics to set the goals, if this was the CSIP process, how would you feel about that?] I think that'd be pretty cool. Yeah, absolutely.	Inclusive
Leader #6	I don't know how many people know that there is a CSIP. Or there should be CSIP. It it has to though it has to change. It has to we have to we have to change our goals, too.	Inclusive

Personal Role in School Improvement

Woven throughout the interview responses from all six participants, one overriding theme emerged over and over: efficacy. Repeatedly respondents shared a shift in their thinking about their own role in school improvement. Prior to this experience, many participants explicitly stated that they understood the work of school improvement to be the work of the school administrator, but this experience shifted their thinking to a more distributed view of leadership and personal ownership for school improvement. Leader #3 stated this shift most succinctly: “I

always picture leadership coming from the admin perspective, and you just kind of like, made me realize like, no, it's really teacher, like, it's the older teachers, it's the newer, whoever wants to have a voice...it really does come down to the staff wanting things to work.” When asked if this work changed their view of school improvement, all six respondents stated that their ownership of the work and belief that they could affect change had increased. “I think it just kind of made me hopeful,” (Leader #1), “Everyone always says top down, you have to start from the bottom up,” (Leader #4), and “Well, how about we just decide, and we go to [the principal] and say, this is what we want...because I now view him more as a support role versus a dictator role” (Leader #3) are just a few examples of the increased sense of efficacy expressed by these six participants (Table 14).

Table 14 *Themes Regarding the Personal Role in School Reform*

Participant	Response	Theme
Leader #1	So I think it just kind of made me hopeful...	Efficacy
	I would be someone that could talk to others...	Efficacy
	I could be someone that kind of is a leader...	Efficacy
	...interesting to see if we're going to have maybe a little committee...	Efficacy
	I'd be interested in being part of that...	Efficacy
	...it'd be cool to have a committee that's, you know, like I said, all the levels like students, classified staff, teachers, admin counselors...	Efficacy
	...maybe the team of us that made the rubrics could meet with [the principal] and talk about our vision for that.	Efficacy
Leader #2	...this rubric would increase my efficacy...	Efficacy
	...then there's there's pressure on me, there's already that buy in to help make sure it happens to encourage my department members and my friends on staff to make sure it's happening...	Efficacy

Leader #3	I always picture leadership coming from the admin perspective, and you just kind of like, made me realize like, no, it's really teachers, like, it's the older teachers, it's the newer, whoever wants to have a voice...	Efficacy
	Well, how about we just decide, and we go to [the principal] and say, This is what we want,...	Efficacy
	Because I now view him more as a support role versus a dictator role...	Efficacy
Leader #4	...as educators are supposed to always be lifelong learners...	Efficacy
	Everyone always says top down, you have to start from the bottom up...	Efficacy
	[What would you say is the role of the teacher in school reform?]So huge because they're the frontline workers...They're the ones working with the kids. And you start with the kids...	Efficacy
Leader #5	I'm most excited to see how it applies to our community here at [redacted], and how we can use this to kind of help improve our school culture...	Efficacy
Leader #6	[Would you have a role in CSIP goals moving forward?] I would hope so...	Efficacy

Results

Looking at the data above as a whole, in context of the four research questions, it is clear that this participatory action research confirmed the viability of complex systems theory as a lens for school improvement and established a process for increasing the efficacy of school leaders with regards to their role in school improvement. Through this process, the variety of school leaders included in establishing school improvement goals was increased as shown by the archival documents included for comparison and the goals established by the research group address systemic change in addition to concrete focused change for short-term goals. More significantly, in the interviews completed, the research participants expressed repeatedly that change can occur at their school, that complex systems theory provides a means for that change, that the rubrics and goal setting methods they practiced provide a framework for that change, and that this process places the responsibility and the ability to make the change with them and the

rest of the staff at their school, not just with the administration. This process and the complex systems theory framework utilized to execute it positively located the process of reform at the school level and increased the efficacy of participants with regards to their role in school improvement.

Chapter V

Discussion

This participatory action research applied a complex systems theory framework to school reform and the continuous school improvement plan (CSIP) process in order to answer the following research questions:

1. How does a complex systems framework alter a school leadership group's understanding of their school as a locus of reform?
2. How does collaboratively developing a complex systems assessment tool affect the self-efficacy of a school leadership group with regards to transformative school reform?
3. How does using a complex systems assessment tool to evaluate their school environment affect the self-efficacy of a school leadership group with regards to transformative school reform?
4. How does using a complex systems assessment tool to set transformative school goals affect the self-efficacy of a school leadership group with regards to transformative school reform?

Through the implementation of researcher-designed professional development, collection of surveys, participant-created documents, historical-site artifacts, and semi-structured interviews, all four questions were addressed; the results are discussed below.

Summary of the Results

The data gathered indicate that complex systems theory, delivered in the manner designed here, is adoptable, can be utilized by a team of school leaders to design tools for addressing school reform, and impacts both individual and collective efficacy positively.

Archival records gathered point to a school reform process at the research site that narrowly

defines school leadership, focuses on discrete quantitative and short-term change efforts, and shows little consistency year over year without addressing systemic change processes. The rubrics, scoring process, and goal-setting process adopted through this research team, in contrast, emphasize shared leadership, systemic reform efforts, and both short- and long-term goal setting with no explicit prompting by the researcher to provide both kinds of goals. The pre- and post-survey data at the professional development provided by the researcher indicate that the participants were able to readily shift from little to no knowledge of complex systems theory and a rudimentary knowledge of the five critical systems of concern to a working knowledge of both areas in a very short timeframe. Further evidence of the efficacy of the professional development provided is borne out in the rubrics, goals, and interview statements which indicate not just an understanding of complex systems theory, but a general adoption of that framework by participants in their understanding of schools and school reform.

The largest set of data in this research comes from the semi-structured interviews completed with each participant. The interviews attempted to gather the participants' thoughts on complex systems theory, the process of creating the rubrics, their understanding of school reform, and their perspectives on their role in school reform. Throughout all six interviews, the participants expressed a working understanding of complex systems theory and gave examples of their application of the framework in their everyday work. Participants indicated that the process of creating the rubrics, scoring the school, and being asked to write reform goals for the school really cemented their self-perception of being leaders in the school when previously they understood school leadership to be confined to the role of administrator. Every participant indicated that the school reform process prior to this work was exclusive or mysterious to them at their school, but having worked through this research felt that utilizing elements of this process,

especially the rubrics they designed, with the whole staff would increase the feelings of shared ownership of school reform in staff and make the CSIP process feel more inclusive. Finally, every participant in their interviews expressed a greater feeling of both individual and collective efficacy with regards to school reform having gone through this research process.

Discussion of Research Question 1: How does a complex systems framework alter a school leadership group's understanding of their school as a locus of reform?

The primary data to answer this question are from the pre- and post-surveys and from the semi-structured interviews. The pre-survey data indicate that these school leaders did not consider themselves school leaders or that they had any particular role to play in school reform, let alone that their school act as a locus of reform. In this research process, a shift in understanding of both where reform occurs and their own role in that reform begins to emerge. This is found in the data as quickly as the post-survey data which was collected within hours of the pre-survey data, after professional development regarding complex systems theory and critical systems of reform. Responses, especially regarding leadership, shift from solely focused on the role of administration to a more collective leadership role and descriptors of school leaders as capable of reforming schools, despite other environmental influences. This shift in thinking is born out in the interview data collected about two months later in the research process. After having spent more time as a leadership collective, outside of the guidance of the researcher, the individual leaders repeatedly expressed a need for their site to more broadly adopt a complex systems theory understanding of their school in order that the school might more systematically and more consistently work toward a meaningful reform goal.

These data sets indicate that shifting a leadership group's understanding of schools and school reform into a complex systems theory framework not only confirms for them their own

self-image as leaders, individually and collectively, in the school; it brings the onus of reform to the collective efforts of the entire school staff rather than centering it on the building administrators or outside environmental actors, i.e., district, state, or federal mandates. Because complex systems theory emphasizes interconnectivity of both the multiple systems within a school and those actors within the systems, it highlights the need for distributed leadership and empowers individuals to see the magnifying effect that their personal change efforts can have on the larger system. As the individuals within the school begin to view themselves as change leaders rather than individuals being acted on, their understanding of the school as a place of reform and their role in that reform similarly shifts. Perhaps the most powerful example of this shift in thinking in this particular leadership group is exemplified by the paraeducator participant. Although she started and ended this process acknowledging the hierarchy inherent in a school system given the levels of responsibilities given to different roles, she repeatedly stated in her semi-structured interview that she now felt that she had something more to contribute, that her voice mattered, and that she could help change the school to be a better place for students. None of her responses indicated that she expected any outside agent or “higher up” to do the work of reform that she, herself, now felt empowered to do within the systems that she touched.

Discussion of Research Question 2: How does collaboratively developing a complex systems assessment tool affect the self-efficacy of a school leadership group with regards to transformative school reform?

In developing the rubrics to assess their school, the leadership group effectively applied their new framework for understanding schools and school reform. Throughout the rubrics, a complex systems theory lens on schools is clearly present, emphasizing distributed leadership, interconnectivity of systems, and a valuing of student-centered results at the heart of their

understanding of reform. Throughout their semi-structured interview responses, the participants referred back to this process as impacting both their theoretical understanding of how schools work and their practical methods of doing their own work. Their new understanding of their own leadership affected the ways in which they interacted with their colleagues and the ways in which they viewed their colleagues' actions. Throughout their responses, the theme of efficacy rose to the surface. Individually, the participants felt a greater sense of leadership and responsibility for reform. Collectively amongst themselves, they each indicated that they were continuing to have conversations as a group about how they could use this tool and their new understanding of school in order to improve their site. And even more broadly, they all expressed a hope that the wider staff would have an opportunity to learn about and adopt this framework so that the leadership and collective efficacy could be further strengthened across the entire staff.

Of all the steps in this research process, designing the rubrics using a complex systems theory lens seems to have had the greatest impact on this leadership group's individual and collective efficacy. By handing them a means and a method to address school reform, they each expressed an enthusiastic desire to continue the work and to share it more broadly with their colleagues. The shared language of complex systems theory, the transparency of the rubrics, and the ability to base goals on a shared assessment tool were all highlighted as benefits and boosts to the inclusivity of the process. While this research is limited to utilizing a complex systems theory as a tool for empowering distributed leadership and increasing individual and collective efficacy, it is possible that the process of designing the tool for assessment and assessing the school was the part of the process that had the more significant impact rather than the framework that was used. However, the responses to the interviews all indicated that the participants also

felt that the complex systems theory lens they were asked to apply reflected both their past and present experiences with schools and helped illuminate their understanding of their leadership, schools, and reform in ways they had not previously considered. So, both the act of designing the tool and the framework used to design the tool seem to have each had an impact on the individual and collective efficacy of the school leadership group.

Discussion of Research Questions 3 and 4: How does using a complex systems assessment tool to evaluate their school environment affect the self-efficacy of a school leadership group with regards to transformative school reform? How does using a complex systems assessment tool to set transformative school goals affect the self-efficacy of a school leadership group with regards to transformative school reform?

Because the evaluation of the school and setting the goals were so closely entwined, the last two research questions will be considered together. The directive to the leadership group for these two components was to use the rubrics to assess the school and then write two to three reform goals based on your scores. From that, the group determined that the site had quite a bit of room for improvement. In the semi-structured interviews, most of the participants took the opportunity to express their surprise at how low their scores were turning out. Most of them expressed that they had previously thought that their school was one of the best with little room for improvement, but with the application of this new lens and the rubrics they developed, they realized that there was room for growth in ways that could really impact students and families. Rather than assuming all was well from the perspective of their individual workspace, these leaders felt like they now had a tool that gave them a broader perspective and were empowered to note areas for growth. In applying that knowledge into goals, the group did not limit themselves to an individual metric or short-term annual goal. Instead, they looked at an

immediate goal that would affect multiple systems, highlighted by the rubrics they created, and longer-term goals that would incrementally and steadily improve all of the systems and their interactions.

While it is difficult to say that the same increase in efficacy would have been felt if these leaders had not also designed the comprehensive school evaluation tool, the participants all indicated that even the process of evaluating the school critically increased their feelings of individual and collective efficacy. Those feelings are borne out in the scope of the goals that the group ended up writing. Given no parameters other than to use the scores and to write two or three goals, the team did not confine themselves to short-term or individual system goals. Rather, they took on a short-term goal that had wide reaching impact and long-term goals that would affect every system being assessed. Given many of their responses stating explicit pride in their work and their place of work, it is likely that these goals reflect both a desire to actually improve the school based on the rubrics designed and an authentic belief that the goals they set are achievable, especially if the rubrics and framework training is shared more broadly as requested by multiple participants.

Implications for Professional Practice

Beyond the potential for significant additional contributions to this new direction in school reform research, several implications for professional practice are highlighted by this participatory action research. Bearing in mind that participatory action research explicitly intends to change practice with social justice in mind, the researcher makes the following recommendations of change to professional practice, both with regards to the continuous school improvement process in Washington State and to school reform practices more generally:

1. A complex systems theory approach to school reform should be adopted by school and district leadership; i.e., school reform work, including assessment of needs and goal writing should not be taken in a one-piece-at-a-time manner, but should be understood more holistically and inclusively.
2. The definition of school leadership should be explicitly broadened beyond school administrators in locations where that has not occurred; even implicitly defining school leaders as administrators limits collective efficacy for reform.
3. A school leadership team and, wherever possible, the entire staff, should have a voice in designing the method by which a school's performance is assessed and goals are written; the more inclusive this process is, the more collective efficacy for change a school staff demonstrates.
4. Building and district leaders should attempt to replicate this participatory action research in their own buildings and supervisory jurisdictions in order to develop comprehensive school and district assessment tools, set long-term reform goals, and to facilitate increased individual and collective efficacy among their staff and leadership team.

Reflection

In reflecting on this research, the researcher recognizes that the participant group could have been strengthened by the inclusion of additional constituents, including administration, counselors, students, and community members. However, given the constraints of time and access, the resulting data are exciting indicators of the viability of this path of research. When initially walking down this path, there was some concern expressed that complex systems theory as a means of school reform was not a viable path of research given that it had largely been abandoned shortly after *A Nation At Risk* was published. The researcher hopes that the data

presented here makes a strong case that complex systems theory was not abandoned because it is an invalid understanding of schools but because of the neoliberal push toward siloing and privatization of schools. Complex systems theory is, in fact, both a viable lens for school reform and it has a strong impact on individual and collective efficacy of school leaders with regards to school reform.

Conclusions

Based on all of the data collected, utilizing a complex systems theory lens among a group of school leaders to understand school reform, guide them in creating comprehensive rubrics to assess their school, and to assess and set goals for their school increases the leadership group's understanding of the school as a locus of reform, shifts their understanding of themselves as leaders in the school, and increases their individual and collective efficacy with regards to school reform efforts. While it is possible that it was the process itself rather than the use of complex systems theory as a framework that had the desired impact on this leadership group, their own reflections on complex systems theory as impactful to their understanding of schools, reform, and school leadership is an indication that it was both the process and the framework that led to the desired outcome. Because this is a new process and application of complex systems theory as a framework for reform, several recommendations for additional research are appropriate.

Recommendations for Further Research

First, additional field work applying this process with a variety of reform lenses in order to measure different impacts on individual and collective efficacy is recommended in order to establish whether the process, the framework, or both are the significant factors to these results. Second, additional field work applying this methodology and framework is recommended in a wide variety of school sites and, potentially, entire educational service districts. This would

provide both additional data regarding the effect of this methodology on individual and collective efficacy and provide additional rubrics for comparison across sites. If enough rubrics in a wide enough variety of school sites is collected, research could be completed regarding universalization of a complex systems theory rubric for comprehensive school reform.

In order for additional field work to occur, several barriers to research must be addressed. First, the full participation of building and district administrators must be ensured during both the training of participants and the development and implementation of rubrics. While the rubrics developed in the current research are valid and demonstrate an increased individual and collective efficacy for school reform at the site, the participants recognized the need for the building leadership to be on-board for any further use of the rubrics. Additionally, administrative voice in the development of the rubrics would provide additional richness of perspective to the final product. To overcome this barrier, it is recommended that the richness of the rubrics and the clear increase in participant efficacy demonstrated in the research presented here be utilized as demonstrations of the merits of continued field research. The other barrier to further research is the reliance on researcher provided professional development in order for the process of rubric development to occur. The research provided here can serve as a model of professional development that could potentially be replicated at additional field sites, but requires modification based on the individual practitioner leading the work at each site due to the embedded nature of that portion of the research. It would be incumbent on individual practitioners to ensure safeguards against undue influence and other mitigating factors if they seek to add to this body of knowledge.

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Appendix A

Informed Consent (focus group)

Participant's name (Please Print): _____

A. PURPOSE AND BACKGROUND

Cassie Ridenour, a doctoral student in the Department of Education at Northwest Nazarene University, is conducting research related to assessing school systems for setting school improvement goals.

You are being asked to participate in this study because you are a member of the Continuous School Improvement Planning (CSIP) committee at your school.

B. PROCEDURES

If you agree to be in the study, the following will occur:

1. You will be asked to agree to this Informed Consent Form, volunteering to participate in the study. Participation is completely voluntary and there will be no adverse effects for declining to participate.
2. You will participate in researcher develop trainings and collaborate in the design of evaluative rubrics.
3. You will complete the rubrics to the best of your ability twice during the school year (August and October).
4. You will work with your committee to use the rubrics to write 1-3 school improvement goals.
5. You will be asked to complete a follow-up interview regarding this process.

These procedures will be completed at your school site and are expected to take no more than 20 hours total.

C. RISKS/DISCOMFORTS

1. You may choose not to answer any question that you find embarrassing or offensive.
2. Your participation in this research is voluntary and you may refuse to participate or discontinue your participation without penalty or loss of benefits to which you are otherwise entitled.
3. If after your participation you experience any undue anxiety or stress or have questions about the research or your rights as a participant, Cassie Ridenour will be available for consultation and will also be available to provide direction regarding medical assistance in the unlikely event of injury incurred during participation in the research.

4. Confidentiality of this research will be maintained by the researcher. Consenting to participating in this research is consent for your research materials to be used as part of any published findings.

Signature of Participant

Date

Appendix B

Survey for Focus Group

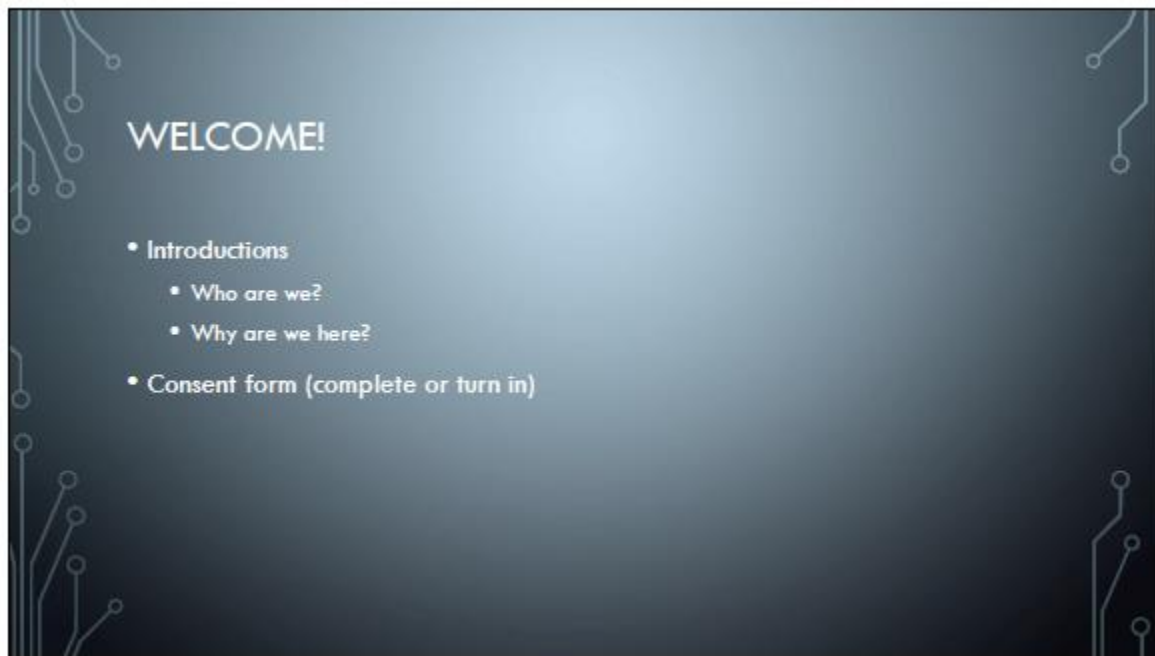
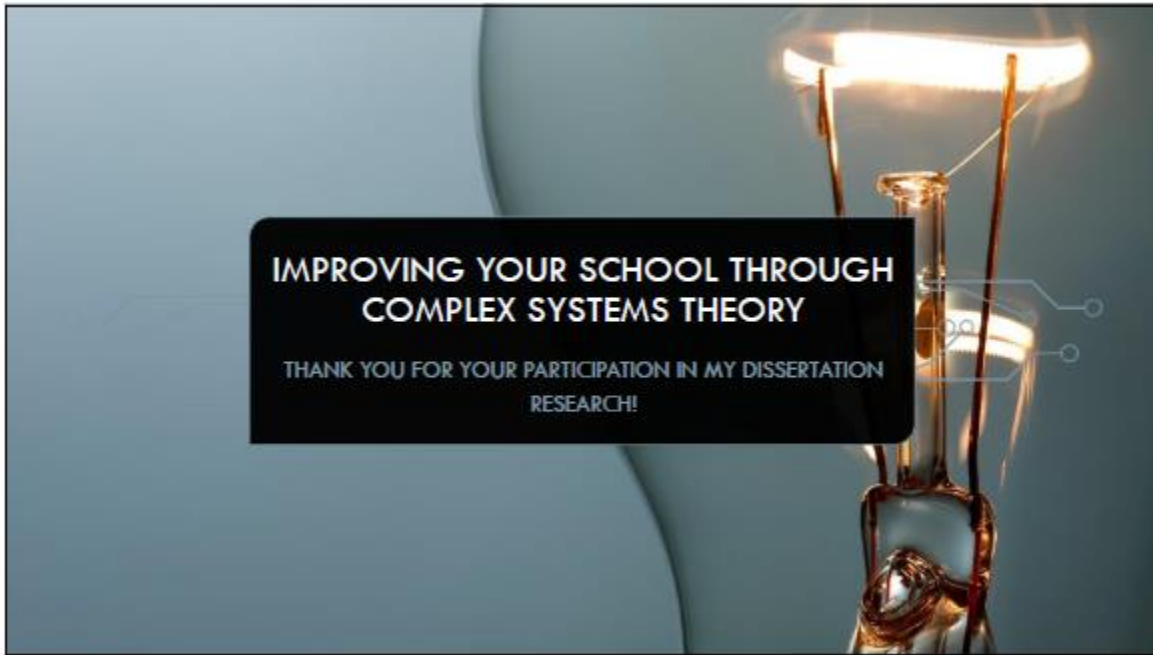
Was populated in Microsoft Forms for distribution and collection.

Schools as Systems

1. Have you heard of systems theory or complex systems theory? [branching]
 - a. yes [to question 2]
 - b. no [to question 3]
2. What do you know about systems theory or complex systems theory?
Open ended:
3. Thinking about your school, how would you describe the instructional guidance system?
Open ended:
4. Thinking about your school, how would you describe the professional capacity system?
Open ended:
5. Thinking about your school, how would you describe the family-community-school system?
Open ended:
6. Thinking about your school, how would you describe the student-centered climate system?
Open ended:
7. Thinking about your school, how would you describe the leadership system?
Open ended:

Appendix C

Professional Development PowerPoint



SCAN HERE!

Please complete this
survey to the best of your
ability and as honestly as
possible



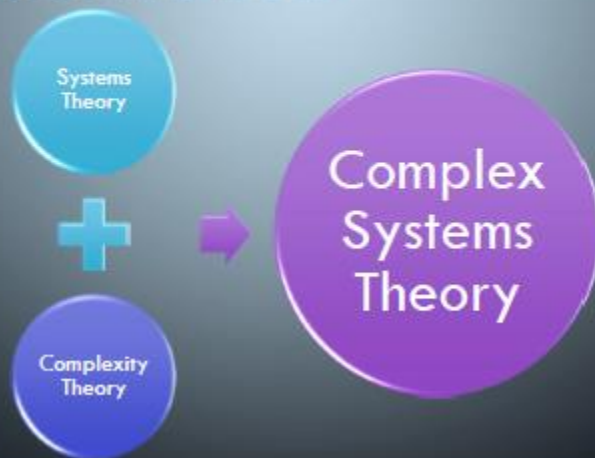
LEARNING NORMS FOR OUR TIME TOGETHER

- Interruptions are welcome!
- Bring a practitioner's lens
- There are breaks scheduled, but take them when you need them

CONNECTION ACTIVITY

- What is it like when your family celebrates?

COMPLEX SYSTEMS THEORY

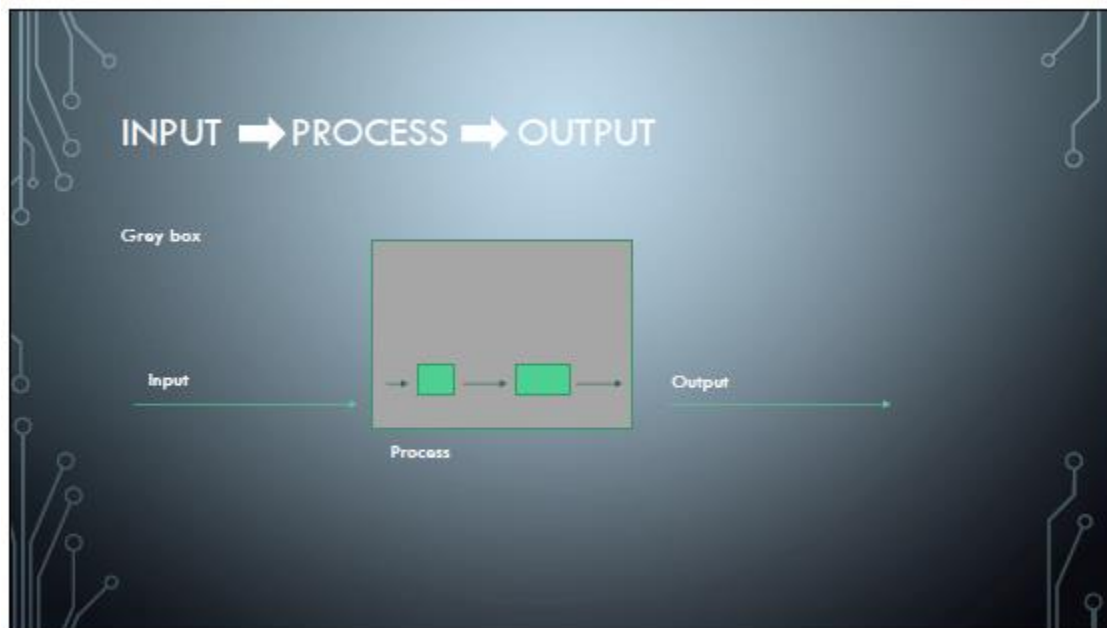
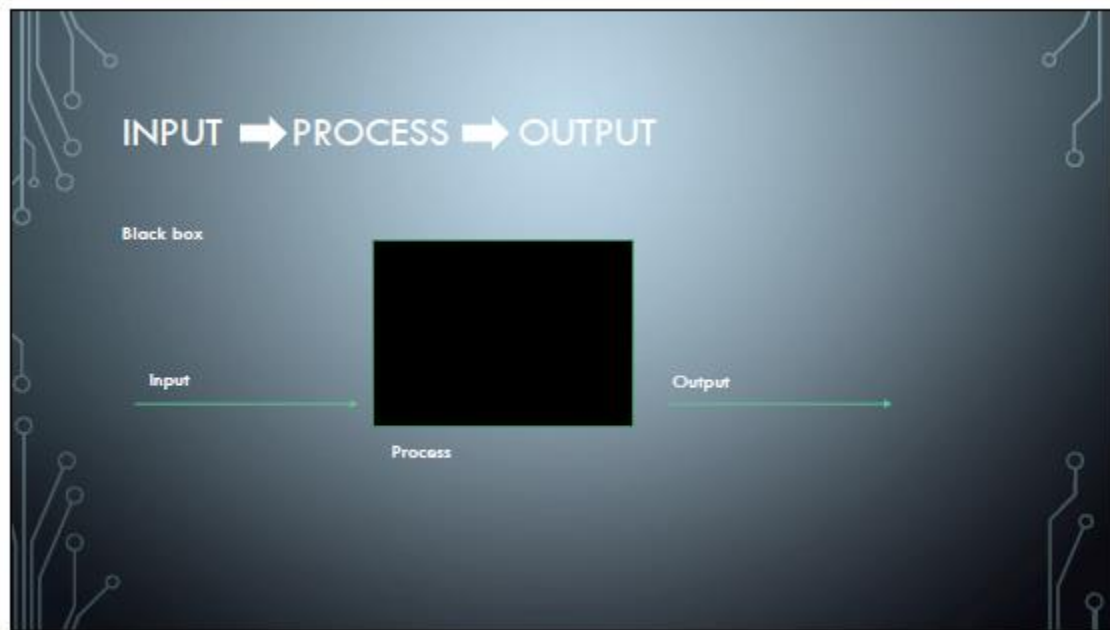


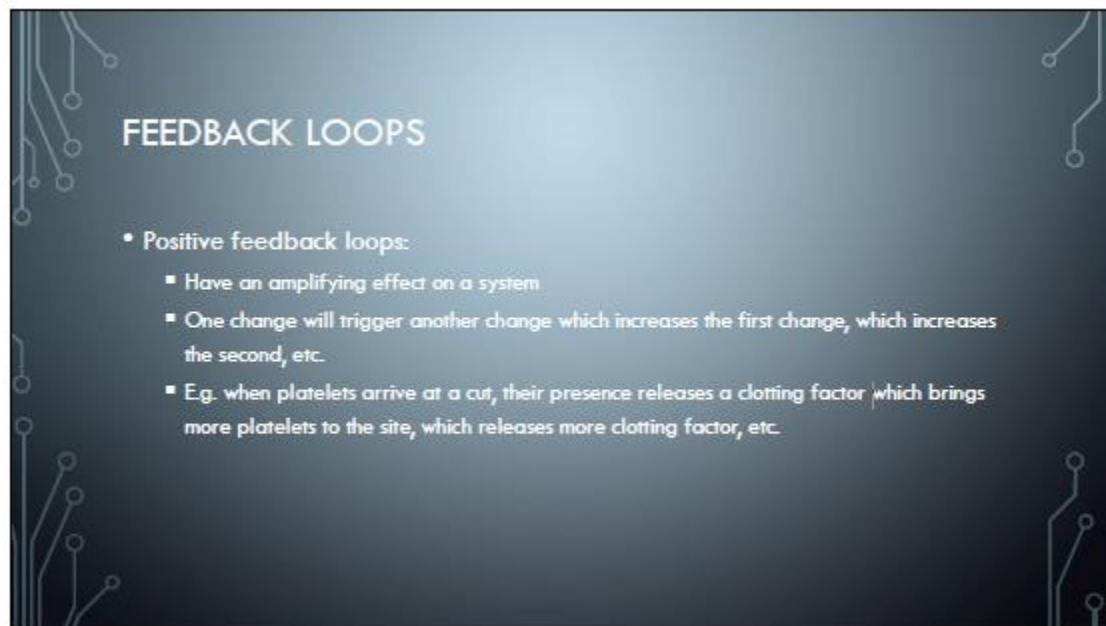
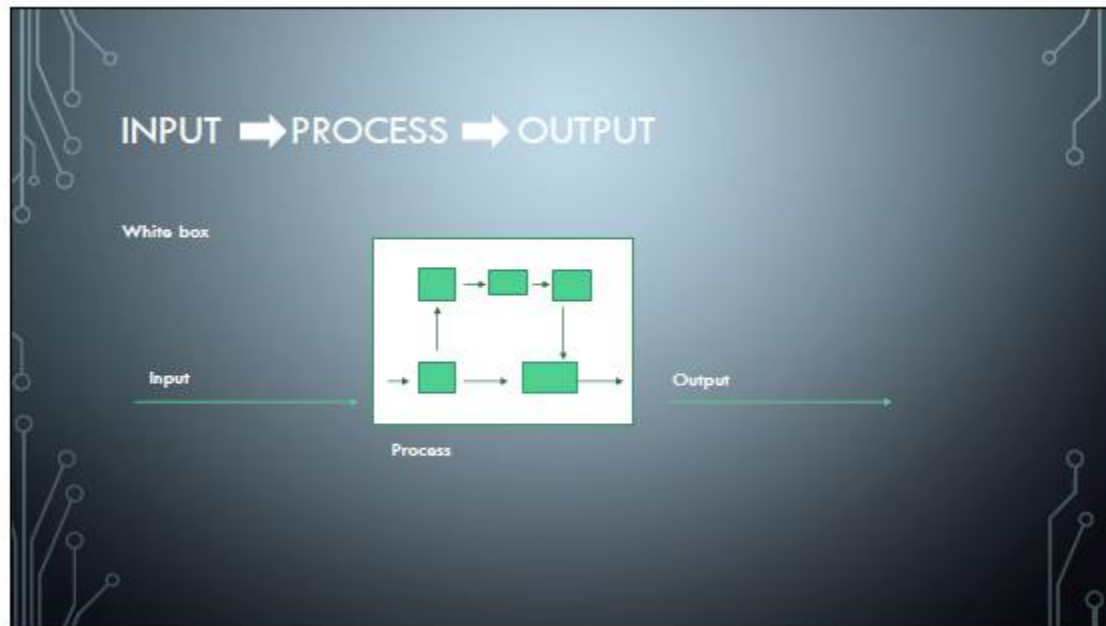
SYSTEMS THEORY

- Has basis in biological and social sciences
- Major ideas for our work:
 - Subject to internal and external pressure
 - Input → process → output
 - Feedback loops

BOUNDARIES

- Inside and outside must be defined
- Systems are affected by external pressure
- Systems are affected by internal pressure





FEEDBACK LOOPS, CONT.

- Negative feedback loops
 - Have a stabilizing effect on systems
 - One factor escalates beyond a norm, which triggers a response designed to de-escalate the first factor; the response continues until the first factor returns to normal parameters
 - E.g. when your body gets too hot, sweat production is triggered until the overall body heat is reduced at which point the sweat production declines or ceases

IPO AND FEEDBACK LOOPS

- In many cases, the processes revealed in a white box diagram turn out to be feedback loops.
- Group activity!
 - Let's work together to make a white box diagram of a hypothetical positive feedback loop and a negative feedback loop in an educational setting

COMPLEXITY THEORY

- Systems are not only subject to IPO and feedback loops
- Other major factors:
 - Disequilibrium
 - Emergence
 - Adaptation

DISEQUILIBRIUM

- Balanced off-balance:
 - Not enough disequilibrium = stagnation
 - Too much disequilibrium = chaos
 - Just enough = change opportunity
 - ❖ The power of purposeful perturbations
 - ❖ Thought activity – Think about times in your own life when you have felt too little, too much and just enough disequilibrium. What did those times feel like? What would it look like to create purposeful perturbations?

EMERGENCE AND ADAPTATION

- When faced with the right amount of disequilibrium, a system will either:
 - Adapt to the new environment
 - Emerge new agents or systems to respond
- Thought activity: When have you encountered systems adapting to disequilibrium or emerging new agents/systems? Did that adaptation/emergence sustain? Why or why not?


COMPLEX SYSTEMS THEORY

- The subject of research is not just one system, but multiple inter-related systems
- Important systems theory rules:
 - Internal and external pressure
 - Feedback loops
- Important complexity theory rules:
 - Disequilibrium leads to emergence and adaptation
 - Purposeful perturbations as catalyst for change



INSTRUCTIONAL GUIDANCE SYSTEM

- Brainstorm: What might be considered part of an instructional guidance system?
- Things to include:
 - Curriculum
 - Physical setting
 - Physical supplies
 - Experience of the teacher



PROFESSIONAL CAPACITY

- Brainstorm: how do you define “professional capacity”?
- Thinking through a CST lens: How do instructional guidance system and professional capacity intersect?



PARENT-COMMUNITY-SCHOOL TIES

- Brainstorm: What kinds of connections should these partnerships have? (strong? Weak? Collaborative? Consultative? Etc?)
- Thinking through a CST lens: What are possible feedback loops between this system and the other two already discussed?



STUDENT-CENTERED LEARNING CLIMATE



- **Brainstorm:** Using Maslow's Hierarchy to jumpstart your thinking, what would a hierarchy of student-centered learning climates look like?
- **Thinking through a CST lens:** How would moving higher on the hierarchy you just designed affect the other three systems we just discussed?



LEADERSHIP THAT DRIVES CHANGE

- **Brainstorm:** What is leadership in a school? (Be creative!)
- **Thinking through a CST lens:** How does/can leadership affect change within systems?

WRAP UP OF THE DAY

- Any lingering questions or discussion about CST or the 5 critical systems?
- Re-take the survey
- Your work moving forward....



PRACTICAL APPLICATION?

- What if.....
 - ❖ Your school could assess all 5 of these systems critically
 - ❖ Your school could assess how all 5 of these systems are interacting with each other
 - ❖ Your school could use those assessments to write transformative school goals

YOUR WORK THE NEXT 2ISH WEEKS....

- The goal:
 - ❖ Rubrics to assess these 5 systems and how they are interacting with each other
- The parameters:
 - ❖ 4-point rubric (Needs Improvement, Basic, Proficient, Distinguished)
 - ❖ Descriptive statements for each level
 - ❖ Possible examples of evidence for each score
 - ❖ Descriptive statements for scoring between each system (e.g. Instruction will be scored independently AND in regards to its relationship with each of the other 4 systems)

Comprehensive School Systems Assessment Rubric

Instructions: Give some general instructions here for other team members to follow. Remember that they won't have the CST training you just received, so consider the language you use to provide instructions.

Appendix D

Blank Rubric Graphic Organizer

	Needs Improvement	Basic	Proficient	Distinguished
Instructional Guidance System: consider a description of what this includes or a brief definition	Each of these boxes should include a description and at least one exemplar.			
...In relationship to Professional Capacity				
...In relationship to Parent-Community-School Ties				
...In relationship to Student-Centered Learning Climate				
... In relationship to Leadership that Drives Change				

	Needs Improvement	Basic	Proficient	Distinguished
Professional Capacity: consider a description of what this includes or a brief definition	Each of these boxes should include a description and at least one exemplar.			
...In relationship to Instructional Guidance System				
...In relationship to Parent-Community-School Ties				
...In relationship to Student-Centered Learning Climate				
... In relationship to Leadership that Drives Change				

	Needs Improvement	Basic	Proficient	Distinguished
Parent-Community-School Ties: consider a description of what this includes or a brief definition	Each of these boxes should include a description and at least one exemplar.			
...In relationship to Instructional Guidance System				
...In relationship to Professional Capacity				
...In relationship to Student-Centered Learning Climate				
... In relationship to Leadership that Drives Change				

	Needs Improvement	Basic	Proficient	Distinguished
Student-Centered Learning Climate: consider a description of what this includes or a brief definition	Each of these boxes should include a description and at least one exemplar.			
...In relationship to Instructional Guidance System				
...In relationship to Professional Capacity				
...In relationship to Parent-Community-School Ties				
... In relationship to Leadership that Drives Change				

	Needs Improvement	Basic	Proficient	Distinguished
Leadership that Drives Change: consider a description of what this includes or a brief definition	Each of these boxes should include a description and at least one exemplar.			
...In relationship to Instructional Guidance System				
...In relationship to Professional Capacity				
...In relationship to Parent-Community-School Ties				
... In relationship to Student-Centered Learning Climate				

Appendix E

Semi-Structured Interview, Suggested Questions

- Tell me about your experience participating in this learning and rubric development.
- What was the most important learning over this time?
- What are you still skeptical about? Why?
- What are you most excited about? Why?
- Has your view of school reform changed through this experience? If not, why not? If so, how so?
- Has your view of the school improvement committee process changed through this experience? If not, why not? If so, how so?
- What understanding of complex systems theory do you now have?
- What is your opinion of complex systems theory as a lens for understanding schools?
- What is your opinion of complex systems theory as a lens for understanding school improvement?
- What is your hope for the implementation of these rubrics?
- What is your pragmatic expectation for the implementation of these rubrics?
- Tell me about your experience participating in using these rubrics to evaluate your school and write improvement goals.
- How does this process compare to your usual process?
- Describe what it was like to use the rubrics to evaluate your school.
- Describe what it was like to use the rubrics to write improvement goals.
- Do you anticipate that the committee will be more or less likely to follow-through on these goals in comparison to previous years? Why?
- Is there anything you'd like to share with me that I didn't ask?

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