

THE FIVE-YEAR CHANGE PROCESS AT A
SECONDARY SCHOOL:
A CASE STUDY

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INTRODUCTION

The accountability movement, federal mandates and the public's changing expectations ensure that most secondary schools will be involved in some type of formal school improvement effort in the near future. While school improvement efforts of the past focused on surface-level changes and specific innovations, the current movement towards school-wide, continuous improvement involves a more comprehensive approach to change including change in the cultural aspects of the school as well as to its structure (Boyd, 1992; Hord, 1997). Leading the change process can be a daunting task and while there is an increasing amount of professional literature describing a school engaged in continuous improvement, there are relatively few studies focusing on the actual process of getting there, especially in the secondary school. Education theorists have articulated a need for case studies which would help increase understanding of the interrelated factors influencing the change process in real school contexts. This study entitled, "The Five-Year Change Process at a Secondary School: A Case Study," reported the results of a longitudinal, exploratory, single-case study, designed to contribute to better understanding of the interplay between interrelating factors influencing the change process in order to help education administrators facilitate needed change in their school organizations more effectively and more confidently.

The study's longitudinal aspects revealed order in the seemingly chaotic and disorderly change process during which the culture of the school was shaped from one of isolation, to one of collaboration and ultimately to a culture of continuous improvement. The change process at the participant school reflected tenets of chaos theory and principles of complexity science particularly *self-organization* and *self-similarity*. Self-organization occurred primarily within a context of four conditions that proved conducive to organizational transformation: (a) an openness to data-including disconfirming data-with increasingly more transparent and sophisticated data collection, analysis and interpretation; (b) widely-shared information including research and theory from various means including the purposeful and challenging work of school community members in numerous, temporary, task-specific teams several times per week and whole group, job-embedded, collaborative professional development opportunities occurring at least

six times per year; c) freedom to act upon this new information through teacher-driven and teacher-led decision-making and widespread invested leadership; and (d) frequent informal and formal, system-wide opportunities to self-reference against the organization's forming identity and intent.

Self-similarity was the result of congruent messages (core beliefs and principles) communicated extensively throughout dense, interactive networks, made up of faculty and community members functioning in multiple teams, creating fields wherein these messages (shared longings) exerted powerful influence. The condition of organizational disequilibrium allowed these messages to be fed back on themselves, greatly amplifying their effects and leading to their iteration throughout the various subgroups—ultimately shaping the culture to one that was consistent with the organization's growing sense of identity and intent. The high energy required for these significant changes and their sustainability came from invested teacher-leadership resulting from a continuous process of meaning-making through collective inquiry, and the compelling draw of the strange attractor: a fervent hope and desire to make a positive difference in a student's life.

THEORY AND RATIONALE

The conceptual framework for this study involved the relationship between the continuous improvement process and the change process central to it. The literature base on organizational culture and organizational change is quite extensive and formed the theoretical base for this study (Deal & Peterson, 1990; Owens & Steinhoff, 1989; Peters & Waterman, 1982; Rutter, Maughan, Mortimore & Ouston, 1979; Sarason, 1982; Schein, 1985, 1992; Senge, 1990). Several theories of change were considered (Burns, 1978; Chin & Benne, 1969; Fullan, 1993; Havelock, 1973; Lewin, 1951; Rogers, 1995). Chaos theory and complexity science added fresh perspectives to this complex social phenomenon, particularly as applied to education (Gleick, 1987; Pascale, 1990; Pascale, Milleman & Gioja, 2000; Prigogine & Nicolis, 1977; Wheatley, 2006). Social systems theory (Getzels & Guba, 1957), cognitive and socio-constructive learning theories (Brooks & Brooks, 1993), and motivation theories (Herzberg, 1968; Maslow, 1943; Rogers, 1995; Vroom & Yetton, 1973) were used as lenses to explore relationships, individual and collective meaning-making, and amenability of individuals to change. An overview of ideas about leadership among organizational theorists over time provided context for issues regarding educational administration in the

change process. A survey published by the National Study of School Evaluation (1998) and used as part of the school's accreditation process was used in this study as a framework for conceptualizing a culture of continuous improvement and other changing instructional and cultural expectations.

As this study was designed to explore the five-year change process as experienced by members of a secondary school community who intentionally pursued school improvement through the establishment of a continuous improvement process, three questions guided this exploration: (a) What are the contextual factors that contributed to the change process at a secondary school pursuing continuous improvement processes? (b) How did these contextual factors interact and inter-relate to contribute to the implementation and sustainability of the continuous improvement process? and (c) How did these contextual factors interact and interrelate to contribute to the change process itself? As such, this study involved a close examination of the phenomenon of change as it existed within the complex contextual conditions of the school organization. These interrelated contextual factors included both situational and cultural features of the school's people, programs, processes and procedures, as well as the forces bearing on them.

RESEARCH PROCEDURES

This study was a longitudinal, exploratory single-case study with an historical analysis, which focused on one high school selected for its persistent efforts toward change despite a noticeable lack of contextual conditions which had been shown in previous research to be conducive to such change. In order to enhance validity and reliability, three principles of data collection were employed: (a) the use of multiple sources of data, (b) the creation of a case study database and (c) the maintenance of a chain of evidence. Data were collected for this study, between November 2006 and March 2007, by qualitative methodology which included an extensive document review of over four hundred documents, open-ended observation and twenty semi-structured interviews of teachers, teacher-leaders, administrators, parents and district leaders. The appendices included a listing of data collected for analysis, interview questions, and the school's stated mission, vision, goals and objectives which changed several times throughout the five years of the study. Although the case study was holistic in nature it also included embedded sub-units to help focus the study and allow for more complex analyses while maintaining the flexibility needed for an exploratory approach. Data were organized and analyzed for patterns and relationships on three levels: chronologically,

categorically and from the perspectives of multiple stakeholder groups. A content analysis was used to identify conceptual ideas which signified changes in the school, as well as contextual factors which played a role in these changes. Within emergent categories, the documents were then analyzed for patterns through a constant comparative analysis to ascertain how these contextual factors interrelated and interplayed. Individual perspectives were then compared within and across interviews to discover new insights and to validate interpretations.

The idiosyncratic characteristics of the participant school and the unplanned events and circumstances naturally occurring even in planned change limit the generalizability of the findings. The detail and level of specificity possible through the qualitative approach, however, should allow school leaders to glean from the finding's insights those which can be applied most appropriately to their own unique settings.

FINDINGS AND INTERPRETATIONS

The findings of this study were reported within a descriptive, chronological framework and included a description of the change process, year by year, beginning half-way through the 2001-2002 school year and ending half-way through the 2006-2007 school year. During this period of time the Hunter Hills school community changed from a "low performing school" as characterized by school documents, to making Adequate Yearly Progress (AYP), an atypical progression. Over this time period the school community also demonstrated changes in operations and school processes as well as a dramatic shift in culture from one more typical of a traditional American high school characterized by isolation of people and fragmentation of ideas to a culture of collaboration and continuous improvement. The organization moved through several stages of growth, each associated with major learnings and subsequent adjustments in operations. Each stage can be identified by an overarching question. A brief summary of each stage follows:

1. Can we really make a difference? In 2001-2002, the faculty was considering a better way to do school and discovering, as they had been empowered with a measure of authority to change existing conditions, they had the power within to make significant changes.

2. What is our current reality? In 2002-2003, the faculty began looking closely at school-wide student achievement data and considering stakeholder perception's for the first time. A new vulnerability accompanied coming to terms with their current reality.
3. Who are we? In 2003-2004, ongoing dialogue, and new tasks forced deep thinking about curriculum and instruction, underlying assumptions about teaching and learning were challenged frequently. The school gained a clearer perspective about what constituted community. Communication improved and trust began to form between subgroups.
4. How are we going to work together and what are we really willing to do? In 2004-2005, this newly established professional learning community grappled with how to work together. They described their transformation of the past three-year period as going from a culture of isolation, to communication, to collaboration.
5. How are we doing and can we do it better? As new ways of working together became more comfortable, more energy could be focused on the work itself in 2005-2006. An organizing framework of rigor, relevance and relationships provided an organizing structure. Leadership was widely shared. Tasks, although only temporary, were better understood, and roles, although more fluid, were better defined. With timely and accurate data and more sophisticated analysis they began to determine program effectiveness, which became a focus of organizational learning.
6. How are we going to keep doing it? Acknowledgement, appreciation and celebration contributed to high energy levels in 2006-2007, along with high levels of involvement, a solid commitment to the movement, and a significant impact on the environment outside of the school.

A reflective pursuit of answers to these questions led Hunter Hills's transformation from a traditional, impersonal, mechanistic twentieth-century school organization to one aware of the changing needs of its environment and as a professional learning community engaged in continuous improvement within a culture of success, they are now better able to respond intelligently to it.

Change Theories

Change theorists have used several analogies to explain the change process in organizations. The most widely used is the three-stage model of Lewin (1951). Lewin's change theory suggested that opposing

forces bearing on the organization create a state of equilibrium. When change is needed a process of unfreezing places the organization in a state of disequilibrium, which favors change. After changes have been made, a process of freezing once again sustains the new changes. Lewin suggested that education leaders go through a process of analysis to predict potential forces likely to bear pressure inferring that leaders should be able to manipulate these forces to their benefit. Schein (1985, 1992) added to Lewin's theory an understanding of the psychological states of individuals within the changing system. He added the need for disconfirming data and its resulting guilt-anxiety as an impetus for change and emphasized the need for positive supports while an individual is in the process of changing. While some of both Lewin's and Schein's ideas of the process of change are apparent in Hunter Hills's experience the past five years, particularly those focusing on disconfirming data as an impetus for change, as a model for leading future planned transformation, it is unlikely that the Lewin/Schein model would have been sufficient. Due to a wide set of variables, many of which were unseen, prediction would have been difficult if not impossible. Rather than looking at opposing forces and conceiving of equilibrium as a preferred state, it is more helpful to, in this case, consider how the school's culture was shaped overtime through the more integrative and disorderly processes characteristic of open social systems.

Co-evolution and Co-creation

As an open social system, the participant school maintained an interdependent relationship with its environment such that a myriad of unplanned actions and events, and their connections—even in retrospect—are difficult to identify. Some of the more obvious were those dealing with geographic, demographic, economic, religious, legal, federal, and district influences, which not only provided impetus for organizational change at Hunter Hills, but also served to keep the organization in a continual state of disequilibrium: a state considered optimal for growth and learning (Prigogine & Nicolis, 1997).

Co-evolution was necessary for the survival and progress of the school organization. As the school organization became more responsive over time to its environment, and a partnership ensued, it became "more intelligent." It became, in essence, a learning organization. The evolution process was sometimes slow and subtle as was evidenced by simple word changes in Hunter Hills's stated vision, mission and goals, such as the term *intervention* used in place of *remediation*. It was also sometimes very sudden as

with the cancellation of the Trimester in year 2003-2004. Most important is that the organization's survival and growth depended on its ability to adapt to changing conditions.

In addition to co-evolving with the environment, the Hunter Hills school community was also involved in its co-creation. In the latter two years of this study, Hunter Hills began implementing program components involving other schools in the district. Hunter Hills' teacher-leaders worked with the ninth grade students at their feeder middle schools, preparing them for transition to Hunter Hills. They also worked with the adults in these middle schools coaching them on their school improvement initiatives. Hunter Hills' teacher-leaders began working alongside High School Progress Teams from the other seven high schools in the district sharing their experiences and insights and gleaning information from them as well. By the end of this study all of the high schools in the district had begun implementing various components of the Hunter Hills model.

Chaos theory, Complexity Science and Quantum Physics

As an open, social system the process of change at Hunter Hills was complex, non-linear and therefore unpredictable. As such, chaos theory, the sciences of complexity and quantum concepts are useful tools to help leaders better understand the change process at the core of the transformation at Hunter Hills.

Transformation

When Nadine, a district-level Executive Director was first given the assignment of leading the school district toward school improvement through Smaller Learning Communities (SLC) early in the 2001-2002 school year, she knew that mandates and policies would not likely lead to change. Instead, she set up conditions conducive to change and supported the growth that emerged. She set up an ongoing study group to include a teacher from each high school in the district and facilitated their access to information and research about school improvement, teaching and learning, and school, district and state's student achievement data. Participants in this group did not have a formal charge to do anything specific with this information back at their own schools. However, when one member of the group, Scott, local site facilitator from Hunter Hills, became more aware of the low performance levels of students at his own school he experienced a sense of anxiety and urgency about needing to act on this new knowledge. This opportunity to stand back, see a big picture of the workings of his school, the district and even the nation, with time to

reflect, to discuss issues with colleagues, be exposed to relevant research and professional literature, and to visit other schools changed his mental models regarding the possibilities and responsibilities of turning around a low-performing school. This new meaning generated energy which was then channeled toward his own school and was exhibited in his interactions there. He gained a new understanding, and with it, a new hope of what his school was capable of achieving: its real power to make a difference in a student's life. A new feeling of confidence in himself and the system was generated, as well as feelings of empowerment. Just as Nadine was a catalyst for change in the district, Scott became a catalyst for change at his school.

Scott acquired approval from his principal to pursue the idea of change with other interested teachers at his school, just as Nadine had done at the district level. A small, informal group of thirteen teachers felt great energy in those first few weeks as they studied the issues together. The inspiration they felt on one particular day as they put their heads together and articulated a shared vision of a different kind of school, and considered the positive student results they now believed were possible, made this a defining moment in the school's change process. The hope of making a difference was compelling, so much so, in fact, that it became what is referred to in chaos theory as a strange attractor (Gleick, 1987). The possibility of "making a real difference for kids" acted as a central force, keeping the faculty forging ahead despite uncertainty and stress, attracting a larger number of teachers each year.

That first small group of teachers organized themselves into an SLC committee and received the principal's approval to pursue further study into its benefits. Self-organization, as a principle of complexity science, occurs through a process of emergence in which an organism, and in this case an organization, experiences a perturbation, in which information is fed back on itself by circulating through networks and amplified until a bifurcation point propels the organization forward, reworking paradigms, and eliciting a change in direction or transformation (Jantsch, 1980). This occurred many times in the process of change at Hunter Hills, always leading to useful breakthroughs.

Leaning heavily on Scott's confidence in the system, and a new feeling of empowerment emerging from the freedom they felt to make decisions, as well as the professionalism they felt at having their opinions acknowledged and acted upon, the informal SLC committee, in 2001-2002, came to the conclusion that a Smaller Learning Communities approach to school improvement made a lot of sense. Shortly after, in 2002-2003, the No Child Left Behind (NCLB) federal mandate resulted in a district

requirement for a Comprehensive School Improvement Plan (CSIP) from every school and Scott was given the formal assignment to lead his peers through this process. Scott chose a Co-Chair who had credibility with the faculty, and leveraging the NCLB mandate the teacher-driven Smaller Learning Communities committee was then converted to a formal CSIP leadership team. This. The decision to add this second body of teacher-leadership, in addition to the traditional Department Chair structure was the first formal structural change made at Hunter Hills. It gave these teacher-leaders some control over who would be a part of those early conversations. The task, they felt, demanded interested, flexible thinkers who were open to change and represented many different networks in the school. The group capitalized on the energy potential of the group members interactions in their various networks. The new CSIP leadership team was made up of a diversity of personalities, leadership styles, ideas, experiences and mental models. A norm of openness within this team led to many lively debates as different points of view and multiple perspectives helped them become more attuned and sensitive to the multiple realities among the rest of the stakeholders.

Networking and critical connections were vital to the flow of information and distribution of energy it generated. The CSIP leadership team worked to encourage as many critical connections as possible. Having two athletic coaches in charge of school improvement was perhaps one of the principal's most important strategic decisions or depending on his intentions, one of the most serendipitous factors in the change process. Putting a coach at the center of the movement and involving networks of teachers who are typically more peripheral to school improvement efforts immediately changed the human dynamics that are more often associated with school improvement efforts.

Scott and his Co-Chair, Sandy, did not have a plan of action for change, a model to draw upon, nor a theory in mind as they began their facilitation of this change process, nor did they have administrative or leadership training, another important factor. Without training or experience, and with free reign, they led by instinct and best guesses. They learned how to facilitate change while facilitating it, keeping just a step ahead of the rest of the group as to their own learning about school improvement and the change process. They experienced numerous set-backs, false-starts, disappointments and made what they later considered mistakes in the process. However, humility about their own limited expertise, openness about their own learning, transparency of their decision-making, and most of all consistency and unwavering focus on student achievement over the years earned the trust of the faculty and other stakeholders as well. Co-Chairs

Scott and Sandy, then the CSIP leadership team, and ultimately the whole school operated from the following beliefs, which together formed their own unstated leadership code:

- It's all about the students. Keep it about the right stuff. Always.
- There are things under our control. As a school we can find solutions together.
- It takes everybody and will affect everything we do. Student achievement is all of our concern. Everybody plays. Nobody sits on the sidelines.
- We all need to be knowledgeable about current research and best practices and make decisions based on them. We need to share what we are learning with each other.
- We need timely and accurate data to understand our current reality.
- We need time to be able to think deeply and reflectively about teaching and learning. We need the opportunity to dialogue and problem solve together. We need to ask ourselves good questions.
- Involve everybody in decisions.
- Work in teams. Mix it up. Diversity is good.
- Develop a shared vision and then keep the vision central.
- Stay the course. Don't give up.

The first CSIP was due early in the 2002-2003 school year. Hunter Hills met this deadline by submitting a placeholder plan with what they considered their real plan just beginning development. The desire to be real and authentic about the process and avoid just going through the motions was a key factor in the success of the change process. The CSIP leadership team led the faculty in mission building and goal setting experiences that year. In consideration of their new goals, current school perception data, student achievement data and school improvement research, the CSIP leadership team made recommendations to the rest of the faculty about possible program component options. Then, through a number of surveys, small and whole group discussions and a rigorous grant writing process, which provided structure and deadlines, the faculty developed their first real CSIP together by the end of the 2002-2003 school year.

The CSIP plan called for two simultaneous sets of actions for this faculty and other stakeholders at Hunter Hills: (a) personalizing the school experience for students and making learning more relevant and meaningful through the establishment of Smaller Learning Communities' structures and strategies, (b)

setting up conditions and processes to make their school more conducive to change: more adaptive and more flexible in order to meet current and future student needs. To this end they commenced their on-going continuous improvement process by establishing of themselves a Professional Learning Community (PLC) and began preparations for the implementation of Smaller Learning Communities (SLC) within their school. The simultaneous nature of these two processes furthered the school's comprehensive, system-wide transformation, ironically by placing the school at the edge of chaos; a place that was uncomfortable but proved optimal for organizational growth (Stacey, 1992).

The implementation of SLC called for each SLC structure or strategy to be implemented in three stages over a three year period: (a) study, (b) design and development, (c) pilot or full implementation. This assured that multiple structures were not implemented throughout the school all at once. It also provided a sense of order as well as adequate time for emotional and physical preparation.

The structure for PLC collaboration was put in place the very next year, 2003-2004, and was foundational to all other changes in the school. This built-in Late Start, two to three mornings per week, gave teachers the time and opportunity to talk, study, design, reflect and collaboratively grapple with difficult issues and complex problems together. The rigorous and purposeful work in which they were engaged over the next four years involved core work processes and included the study and design of each of the SLC program components; development and analysis of a standards-based curriculum and common, formative assessments of those standards; the study and implementation of best instructional practices; and the analysis of department and school-wide processes.

Change in Organizational Subsystems

Beginning with the 2003-2004 school year, with new habits of interaction among the teachers, the school experienced dramatic changes in its inter-related subsystems: its structures, tasks, technology, and human dynamics. As is the case in open social systems, changes in one subsystem affected all of the other subsystems resulting in an ultimate shift in the culture of the school.

Tasks and Technology

All stakeholder groups experienced changes in the tasks to which they had been accustomed. Teachers, who traditionally spent their days teaching, assessing, attending meetings and visiting with parents and

students periodically, were now spending regular time collaborating with their colleagues as well. Teachers who normally had little opportunity to think deeply about their curriculum, instruction and assessment were being compensated for their time to do so. Teachers who were used to attending trainings were now facilitating job-embedded professional development experiences. Teachers who were used to designing and presenting lessons were now designing and evaluating programs, developing curriculum, and creating new methodologies.

Teachers were learning about implementing new instructional practices as well. For example, all teachers learned about the reading and writing demands of their various content areas. All teachers learned about the six trait writing rubrics and they all participated in scoring their school's newly designed school-wide writing assessment.

Like their students, teachers now had assignments of their own with deadlines to meet. They were expected to share what they were learning in their Study, Inquiry and Focus Teams with the whole school on the school's professional development days held six times throughout the year. In the last two years of this study teachers were required to do action research in their classrooms as well, keeping data and sharing these results with peers.

Teachers, who on occasion met with struggling students after school, were now spending three mornings a week working with high and low achieving students. High school teachers were teaching middle school students on middle school campuses and teachers were teaching parents at parent workshops. During the last year plans were being made to begin holding parenting workshops off-campus at the community library as well. Teachers, parents and students who typically worked separately were collectively problem-solving. Students and parents, for example, worked alongside teachers in various focus groups and councils and participated in school program evaluation and renewal activities.

Teacher-leaders were also navigating new territory. The concept of a teacher-leader was a new concept for Hunter Hills. Teachers were used to chairing committees, but now they were involved in writing and managing federal grants, maintaining very large budgets and conducting program evaluations. They wrote federal reports and made appeals before school and community boards and councils. They traveled to other schools, regional research centers, and even to meetings at the Department of Education in Washington D.C. They were called upon to solve conflict among their peers, teach parent groups, and lead parent

discussions. Teacher-leaders worked with experts, consultants, and third-party evaluators. In the later years of this study, they worked with school principals and leadership teams from other schools, advising them in their school improvement processes. They also presented their new insights about school improvement and the change process at a national conference.

Role ambiguity and role conflict contributed to a feeling of confusion at times. Some roles seemed flip-flopped. Teachers' work at times resembled the typical work of counselors and counselors were now teaching PAWS classes. Teacher-leaders were involved in tasks typically assigned to assistant principals, whereas assistant principals were assigned PAWS advisory classes to teach as well. When the new principal, Barbara, came to the school in 2005-2006, for example, she found that Sandy, a teacher-leader, was more familiar with some school operations than any of the assistant principals. Sandy was able to advise the principal regarding certain budgets, federal reporting requirements, and staffing board recommendations.

Tasks, Technology, and Structure

The hierarchy at Hunter Hills was fuzzy and confusing. Whoever was in charge and by what authority wasn't clear. Although the hierarchy seemed flatter to the teachers as roles became more fluid and task-based, many never did feel that they had access to the principal until a new principal came on board in the middle of the fourth year. Dean's nebulous role as principal also contrasted strangely with the seemingly steadier, supportive role of the district's Executive Director, Nadine.

Teachers worked on several teams each year for very specific purposes, creating knowledge together. They worked within their departments determining power standards, creating common assessments, developing intervention strategies and analyzing department processes. They collectively analyzed student work together. Teachers also worked interdepartmentally in various study groups supporting each other in the implementation of instructional practices.

In Inquiry Teams teachers worked on the development and preparation of program structures such as the PAWS advisory program and Skinnys. These groups were cross-curricular, which allowed for development of new relationships, cross talk about teaching, and development of new networks. Working with people outside their own content areas resulted in many opportunities to challenge underlying assumptions about teaching and learning. In additional interdepartmental inquiry groups, teachers mapped

and integrated curriculum in preparation for wall-to-wall Academies. This forced teachers into situations in which they had to explain, defend and justify their curriculum proposals to their peers. Teachers gained increasingly sophisticated levels of understanding of their own content while gaining new perspectives. The effort was sustained long enough that even those teachers who seemed to get by in the first year with minimal effort eventually could not escape the need to dig deep into their curriculum. The quality of these interactions varied throughout the school, team by team and over time. Despite initial training, facilitating teams of peers proved tricky for some teachers, in the beginning, greatly increasing their discomfort.

Communication—One-way→ Two-way

Communication as a factor was an ongoing concern throughout the change process at Hunter Hills. A great amount of attention was put into procedures and processes to make sure information was shared widely and that group members didn't feel out-of-the-loop. During the period of this study there were substantial changes in modes of communication among the stakeholders. In the first three years of the study, the teacher-leaders communicated with the faculty face-to-face, through memos, letters and emails. The school's website displayed more general information. In the latter half of 2004-2005 and beyond, formal CSIFT meeting agendas and communication templates helped formalize and organize communications. A blog was also set up for teachers to communicate informally amongst themselves about school improvement issues and concerns. Communication with parents was mainly facilitated through a monthly newsletter and an electronic student information system.

A shift from one-way to two-way communication with stakeholders increased the effectiveness of communication substantially over time. A pattern for this shift in communication is clear: telling inviting partnering. In the beginning, the typical form of communication with all subgroups was to present information in a one-way direction and then ask for input. In the second phase, the faculty members invited other groups, i.e. parental and student, into conversations. This typically resulted in the faculty learning more about the issue and gaining an increased understanding about the stakeholder group and vice versa. In the third phase, the school organization and the stakeholder group actually partnered in problem-solving together. Being able to problem-solve collaboratively assured more thorough understanding among all parties, increasing the probability of effective and sustainable solutions.

Tasks, Technology, Structure and Human Dynamics

Human dynamics were a factor as tasks became more challenging, leading to periods of tension and increased stress for some teachers. Little relational trust was exhibited in the early years specifically between the faculty and administration, parents and the school, students and teachers. Some of the Department Chairs felt their status had been reduced and their power usurped by the CSIP teacher-leaders. Issues of access, power and status, however, lessened over the years as tasks became more familiar and shared leadership increased. Trust and confidence was built over time.

The school building itself, built to accommodate wall-to-wall Academies helped further the change process. The availability of a room large enough for this collaborative type of work/learning was a factor in the change process at Hunter Hills. An entire juggling of classrooms was begun in the latter half of 2005. The leadership team also rearranged their class schedules so as to assure that a teacher-leader would be available during all periods of the day to conduct school improvement business or professional development activities. These were not easy changes for anyone, even the most committed, but conditions of discomfort seemed to define the change process at Hunter Hills.

Change in School-wide Processes—Collaborative Professional Development

In addition to its subsystems, several school-wide processes went through major changes as well. The most dramatic change was in professional development. The traditional professional development approach changed to one that was increasingly more collaborative and job-embedded until it became impossible to separate it from the day-to-day work of the school. Job-embeddness is a popular professional development term in education today, and as such, its meaning has become somewhat generalized to mean training that is closely related and perhaps school-based. In this study, however, the term is used in the strictest sense. Job-embedded professional development at Hunter Hills was not professional development closely tied to the teachers work; it was the work of the teachers. Teachers learned how to design common assessments by designing, implementing and analyzing their common assessments. They learned how to integrate and map curriculum by integrating and mapping their curriculum. New skills were often put to actual use during more formal professional development activities, taking advantage of opportunities to scaffold new learning. When learning about how to effectively work in teams, for example, real teams were actually formed at the professional development experience and were guided through their first team meetings there

at the training, under scaffolded conditions. The job-embeddedness of this professional development was also evidenced in a list of program components which they referred to as “professional development tools” in their accreditation manual of 2004-2005: School Data Analysis, Summer Leadership Conference, Late Start Time, Smaller Learning Communities, Professional Learning Communities, Collaborative Process, Comprehensive School Improvement Committee, and School Community Council. Even meetings were considered opportunities for learning.

The curricula for professional development experiences were very different than in the past as well. In addition to more traditional topics, which focused on instructional practices, the new collaborative professional development focused on new concepts such as how to work in collaborative groups, norms of collaboration, peer coaching, common assessments, action research, data analysis, backwards curriculum design and the collaborative analysis of student work.

Cognitive and Socio-constructivist Learning Theories

Cognitive-constructivist and socio-constructivist-learning theories can be used to better understand the mental and psychological processes involved in the learning among organization members in this process of change (Bruner, 1966; Vygotsky, 1978). According to these theories, each person came to various understandings at different times related to the connections they were able to make to their previous understandings. The long-term, continuous nature of the movement accommodated these staggered insights as did efforts to differentiate professional development in the later years. Their insights were not only dependent on personal connections but many concepts were socially constructed; dependent on mutual engagement. In a community of practice, the faculty and other stakeholders learned together to solve current, complex problems unique to their population. Sometimes teacher-leaders tapped the resources of experts, consultants, and district specialists for technical assistance, but much of the facilitation of professional development for the school came from a pooling of expertise and experience already existing in the school.

Inquiry and Collective Reflection

The process of school improvement was based on a habit of inquiry. The continuous improvement process was referred to as an action research cycle by teachers. All gatherings were designed around collective inquiry and reflection. Questions, such as, “Who are we?” “What do we want our school to be

like?” and “What am I teaching and why am I teaching it?” were used to lead discussions in general meetings as well as in professional development activities throughout the five years. This double-loop learning allowed organization members to step outside the realm of their everyday actions, collectively reflect on their progress and make sense of their work. Almost all PowerPoint presentations made over the years began with a recap of current data, decisions that had been made previously, reasons why those decisions had been made, and a quick overview of pertinent research. Likewise, teacher-leaders intentionally used most every gathering as an opportunity to help group members remember why they were doing the things they were doing, always trying to bring coherency to their work, to the point of redundancy.

Disorder

The comprehensiveness of the approach, system-wide change, as opposed to what Tyack and Cuban (1997) referred to as tinkering around the edges, contributed to the frustration of the process, and, ironically, made the process possible. The degree of disorder felt by the school community influenced the degree to which organization members ventured outside—and how long they stayed outside—their comfort zones, until such time as they were, confused sufficiently as Wheatley (2006) suggested, to allow multiple, long-standing paradigms to be shifted. The likelihood of a change in the mental models of organization members, foundational to reculturation, was dependent upon the degree to which group members were forced to face the current realities of their student’s and school’s current performance; engaged in deep discourse with colleagues about real instructional dilemmas; engaged in challenging, stimulating and purposeful work, in their core work processes; engaged in work that challenged their underlying assumptions about student learning; and had experiences that caused them to access a bigger picture (a systemic view of the work of the whole school in order to find their place in it).

System-wide Self-organization

It is ironic that the confusion, uncertainty and disorder felt by organization members during the change process actually worked to create a more stable organization, meaning adaptive and flexible, better able to function on the edge of chaos where growth and learning could thrive. As Reigeluth (2004, p. 9) predicted,

“Appropriate behaviors and structures emerged spontaneously through self-organization, without heavy controls,” and in this case, the virtual lack or visible involvement of administrative control. System-wide self-organization evolved in the midst of the following organizational characteristics: (a) openness to disconfirming data, (b) information widely shared throughout the organization through dense networking and critical connections, (c) freedom in choice making, and (d) a habit of self-referencing.

Openness to Disconfirming Data

Hunter Hills was open to information, even disconfirming data. Information about stakeholder perceptions and student performance was actively collected and fed back into the system. Multiple interpretations of this data were pursued. Teacher-leaders provided information and asked various groups at various times, “What do you make of this?” While teachers were curious about the perception data, they were initially defensive about student achievement data. It was difficult being open to information from the environment that threatened their clear sense of who they were. Once they did this, however, they were not the same and could not keep functioning the same as they had done previously. Student achievement eventually became accepted as a whole faculty responsibility and accomplishment, increasing ownership among a critical mass by 2004-2005.

Information Actively Sought and Widely Shared

Expertise was gained from outside experts, consultants, district specialists, regional research center personnel and even teachers from other schools. The faculty, were sent to conferences, particularly the Instructional Leadership in the 21st Century conference and Professional Learning Community conferences, and to visit other schools which were facing similar kinds of challenges and finding successes. School visits were considered by interviewees to be some of the most helpful types of supports. Not only did the visits help teachers and administrators with potential solutions to their problems but they also helped the school community get a bigger picture of what was going on around the country, encouraging systems-thinking and resulting in a deep sense of responsibility.

A small room off the central library housed research, data, professional literature and other reference material for easy access to teachers and teams. Information gleaned from these and other sources as well as results of the teacher’s own inquiry and action research were not only shared by teachers within their collaborative teams but with the whole faculty at the six formal professional development gatherings held

throughout each school year and the annual Summer Leadership Conference. Some of this information was compiled and printed in school-based manuals and distributed among the faculty. Information was gathered and shared with other stakeholders as well in the form of reports, newsletters, presentations and the website.

Freedom of Choice

The school improvement movement at Hunter Hills was teacher-driven and teacher-led. The principal, by his absence, allowed the teachers a great amount of autonomy and decision-making authority in this process of change. This allowed those closest to the problems to struggle to find effective solutions. The organization was able to self-organize because members were empowered to act upon the knowledge and information they were learning and creating. Once people knew the situation well they felt responsible for it. Once Scott saw the performance data from his school, for example, became aware of the research regarding smaller schools, visited schools like his where students were succeeding, and was given freedom to do something about it, he was duty-bound to act. Freedom created in Scott a feeling of responsibility for the success of the effort. That same dynamic was evidenced in the leadership team and ultimately throughout a critical mass of the school community.

Representative Leadership→ Participatory/Shared Leadership

With the freedom they had been given by the principal the CSIP leadership team began their work operating as a representative decision-making body. They made program decisions based on their school's data, other successful programs, research and regular input from the faculty. They ultimately were able to shift from this representative process of decision-making to one that was more participatory once the Late Start was in effect in 2003-2004. While the school still used surveys to gather input, as before, the PLC collaboration allowed teachers to talk through issues with their peers and give more informed input and feedback. During this time, shared leadership was highly valued and an increasing number of teachers began facilitating various teams.

Representative Leadership→ Participatory/Shared Leadership→ Invested Leadership

By the end of 2004-2005 the structure of teacher-leadership was again re-organized, this time around the core beliefs and ideas of the organization: relevance, rigor and relationships. PLC collaborative work had become a part of the culture and teachers had been engaged in curriculum, instruction and assessment

work for two years. Decision-making was even more inclusive of the faculty due to a more sophisticated understanding of educational and instructional issues throughout the community, leading to better solutions and much greater ownership. This deeper understanding and the authentic ownership it allowed became the basis of invested leadership at Hunter Hills.

The school slogan, “Learning is not a spectator sport” had a special application to leadership at Hunter Hills. Leadership was considered a behavior as well as a position and there had become an expectation that everyone be involved as a formal leader of something. By the beginning of 2005-2006, an increased number of faculty members had become fully invested in the transformation at Hunter Hills due to numerous meaning-making experiences and the authentic ownership they created. Authentic ownership, more than just general buy-in, refers to a sophisticated understanding of the group’s core values, ideas and beliefs. This level of ownership was developed through partnering in the struggle for solution finding. It is this authentic ownership that separates invested leadership from shared leadership, which is a term usually used to denote the distribution of leadership responsibilities among organization members but does not convey the weight of the responsibility felt by leaders toward the success of their assignments. Invested leadership involves deeper understanding, more personal engagement and greater emotional attachment or risk. The meaning-making which is foundational to authentic ownership and invested leadership was clarified and reinforced through a process of self-referencing.

Self-referencing

The Hunter Hills school community engaged in self-referencing regularly. Self-referencing, according to Wheatly (1999, p.85), refers to a process in which the organization “checks itself against its core ideas, values and beliefs.” She explained, “When the environment shifts and the system notices that it needs to change, it always changes in such a way that it remains consistent with itself.” Like an airplane that is typically off course 98% percent of the time but through a system of self-checking, rights itself to stay on target, so does the organization that self-references often. In light of this, the numerous and seemingly redundant efforts made by the school community at Hunter Hills to know themselves were some of the most significant activities in their change process.

Know thyself→ Identity and Intent

From the earliest days of this movement, the Hunter Hills school community made a concerted effort

to determine the current realities of the school community. The most current perception data and student achievement data was a part of virtually every faculty gathering throughout the years for various purposes. The school community was constantly reassessing “Who are we?” and “What do we want to become?” These discussions helped the organization see more clearly who they were, clarify what it was trying to accomplish, clearly recognize its strength and weaknesses; in other words, develop a clear identity and clarify its intent over time.

Identity and Intent→ Meaning-making→ Ownership

With a clear identity and intent, constructed by the school community, the whole system developed greater coherence, and with that coherence, greater meaning. With greater meaning and the ownership it generated, it could respond intelligently to changes in its environment. Decisions could then be based on this identity and intent as opposed to trends and unquestioned mandates. At Hunter Hills, this shift was evident as the organization began to respectfully challenge district procedures which conflicted with its intent. Paradoxically, the greater meaning and ownership and the clearer the identity and intent, the more diversified departments and teams could be in their various approaches to problem-solving, and the more professional development could be differentiated. The system was then able to benefit from multiple approaches, capitalizing on people’s strengths which were all naturally targeted toward group success.

Identity and Intent→ Meaning-making→ Ownership→ Energy

This greater meaning also generated great amounts of energy needed to make and sustain difficult changes in individual and collective behavior. Teacher Nate, for example, shared how when things clicked for him, when he “got it,” the result was life changing. He now approaches his curriculum and instruction differently and has even created a new teaching tool that he is preparing to market. In this teacher’s case his deep understanding or meaning-making generated the energy needed to make tough changes and has sustained him in his work since. He shared that although he was to the point of quitting, he now has new energy, and he has noticed the same dynamic in his classroom among his students. When information is meaningful, it is a force for change and provides access to creative potential.

Purposeful work, and collective reflection, helped members within the organization uncover the underlying assumptions that formed their mental models and controlled their views, creating a deep center with increasingly more clarity about who they were and what they needed. The clarity of this identity and

intent provided greater understanding, illuminating their purpose which then brought meaning to their work. The hope it provided was motivating. Teachers want their hard efforts to mean something. As Nate said, “I wanted to be of value.” The last perception survey of this study showed that teachers felt their work was challenging, but they also said their work was stimulating. Work that is challenging, but meaningful, stimulates. It not only generates the energy needed to make changes, but also sustains efforts.

Identity and Intent→ Meaning-making→ Ownership→ Energy→ Sustainability

When asked if there were any surprises in the change process at Hunter Hills, each of the district-level interviewees answered that they were surprised the change efforts at Hunter Hills continued beyond the initial push for school improvement, which is more often the case in their experience. At Hunter Hills, the school community agreed that they would do whatever it took to bring about student success. When they met with disappointment, such as when multiple federal grant proposals were denied, or when the district rescinded its approval of the trimester system, they determined that they would find a way to carry out their innovation even if it meant that their plans would take longer than they had originally planned. Clearly, the financial resources and federal and district mandates were not the sustaining factors at Hunter Hills. Rather, the energy produced from meaning-making allowed Hunter Hills to stay the course, solid in their reasons for doing so. Literacy, for example, remained a focus for all five years of the study, ultimately leading to several major breakthroughs.

Energy Potentials and Energy Channels

Quantum physics can be used to conceptualize the flow of energy involved in the change process. At Hunter Hills, energy was created, as Wheatley (2006) suggested, at places where members joined forces to work on temporary tasks. The availability of places for these exchanges became critical. Energy was also generated when new understanding came upon a critical mass of the organization. A highly personalized professional development experience awaiting teachers when they came back to school in 2005-2006 changed perspectives and re-focused attention to purpose and meaning. For those involved, it had an energizing effect, enough to actually change classroom practice. This energy was spread through overlapping networks of interactions due to multiple teaming through what scientists term reaction channels, having a renewing affect on the organization. At Hunter Hills, energy potential was also formed

anywhere these reaction channels overlapped. Parents and community became energized after better understanding their own current reality—that there were many families in their area who lacked experience with higher education. New energy was also generated within the counseling department when they redefined their roles and responsibilities in the last year. The overlapping of these two energy channels resulted in a very successful, well-attended and well-supported College Prep Night, generating even more energy, which has since supported new relationships and subsequent positive actions.

Networks of Interactions—Relationships

Just as scientists have been unable to pinpoint a single element as a basic building block of life, at Hunter Hills there was no apparent causative agent. Each member of each subgroup was a change agent; they each had the capacity to interact with one another, facilitating energy flows through what Fullan (2005) called progressive interactions: interactions which propel the movement forward. This was evident as departments worked together in new ways, supporting each other and creating better learning opportunities for students. Teachers who visited schools and then returned to share their insights passed on energy as well. The auto mechanics teacher who assigned writing in his classes and found that students performed better on tests became energized and shared this knowledge and energy school-wide.

Teacher-leaders became information brokers, facilitating energy flows, as they supported relationships and networks. The name of the CSIP committee was changed in the 2005-2006 school year from the Comprehensive School Improvement Plan (CSIP) committee to the Comprehensive School Improvement Facilitation Team (CSIFT) reflecting this shift of thinking. Rather than working as a team to facilitate school improvement, they would facilitate the networking of numerous teams each facilitating school improvement. When the new principal, Barbara, began her work at Hunter Hills in February 2006, her involvement with and progressive interactions among students, teachers, administrators and parents developed energy potential at every intercrossing, creating new energy and sending it along numerous energy channels. This energy was clearly evident upon observation and during interviews conducted in the spring of 2006-2007. Researcher field notes of March 13, 2007 read:

There is an exuberance in this school. I've felt it every day that I've been here this week. It's on the faces of the kids and in the tone of teacher's voices, even when they are talking to one another. It's even in the office. The spiritedness of the kids is not high emotionality. It seems much more grounded.

There is a confidence in it. It's an inner energy.

Energy Fields

Network upon network an energy field, like a magnetic field, invisible, but exerting a definite force, was created. Within this energy field, the school's core beliefs had a powerful influence on the school community. Instead of a picture or dream of the future, the shared vision, collaboratively constructed, acted as a powerful message, a shared longing that was communicated through dense networks filling up the spaces throughout this field, influencing everything and everyone. Everyone in the organization picked up on the messages, these unseen influences, because they were strong and congruent with shared beliefs.

Shaping the Culture through Self-similarity—Fractals

Once certain core beliefs became the mental models of a critical mass they had a powerful influence on the features of the organization. The things that the school truly valued, not those things that “should” be valued, were evidenced in the behavior of its teachers and administrators. Due to the density of overlapping networks and the energy fields they created, the influence of these shared values was evident in the iteration of its simple but compelling principles, throughout the organization shaping its culture through self-similarity.

Fractal geometry can help illuminate the phenomenon of organizational self-similarity exhibited in these iterations. A fractal is created from a simple formula which is fed back on itself resulting in a complex shape which is then repeated on many levels through a process of continual self-referencing to a simple initial equation. In a quantum, relational world, small simple truths are amplified many times throughout an organization. In this case, as Wheatly (2006) suggested, what the organization wanted to accomplish and how the members wanted to behave acted as the initial equation, which provided a lens to interpret information. At Hunter Hills, the school community's true values and beliefs, their authentic desires, and their real intent were amplified. An orderly pattern emerged and was then iterated throughout the various subgroups in the system: a fractal arrangement of self-similarity. One example of the recursive patterns evidenced at Hunter Hills involved increased feelings of empowerment, efficacy and proactivity. Teachers shifted from feeling powerless in their ability to influence students, fearful in the face of new

expectations, uncertain due to new accountability, discouraged with the lack of public support, and tired of “unreasonable” demands to feeling empowered and exhibiting greater efficacy and increased proactivity. Teachers felt more confident in their ability to find solutions. They began to challenge rules and old assumptions, and take more risks. Students followed suit, showing the same proactivity. For example, students asked for approval to update the school’s dress code and then followed through. Parents, as well, have become involved in proactive ways. Barbara explained it as, “The community having found its voice,” and was evidenced in the active parental support in helping students prepare for college. Other recursive arrangements involved participation, involvement and collaboration; relevance, rigor, and relationships; responsibility for one’s own learning; an academic climate; a culture of success; and invested leadership.

Leadership to Support Two Phases of Change

There were two distinct phases to the change process at Hunter Hills and two very different leadership configurations supporting the primary task of each.

Phase I—Transformation

In Phase I, conditions conducive to change were established and the school experienced a reculturation and a transformation. The school community experienced a shift in culture from one of isolation to one of communication and then collaboration. The school community developed new ways of perceiving their purpose, their work and ways of working together. During Phase I, all of the organization’s major subsystems were involved in a dramatic upheaval. Stakeholder beliefs about teaching and learning and their underlying assumptions were challenged as they grappled with disconfirming data and new information. Mental models were changed as a result. Confusion, uncertainty, vulnerability, role ambiguity, a feeling of disorder, a lack of clarity, issues of power and status and a lack of relational trust were evident as the organization went through extreme morphing. Then through a process of emergence the group experienced self-organization (Jantsch, 1980). Wheatley, in an interview with Sternberger (1995, p.1), described the discomfort typically associated with this process:

On a personal level, it's a process of going from a clear sense of who I am, to letting in information that threatens me, to realizing the information is so important and so big that I can't stay the same and

deal with it. It means going through a period of falling apart and letting go so that I can recreate myself to work better and fit better into the environment that has pressured me to change.

For the organization, Wheatley offered:

I think what may be helpful to school administrators is the realization that all living systems try to resist change at the beginning in that they tune out information about the necessity to change. After that information gets inside the system and people start playing with it, expanding it, and deciding that something here is very important, then the system has to be willing to let go of its present sense of itself. It must dissolve to recreate itself so that it fits in the environment that required it to change.

(Sternberger, 1995, p. 1)

The formal leadership during this phase at Hunter Hills included a principal who was willing to step back completely and let the faculty redefine themselves. He did not interfere with the process. The lack of this administrative involvement in Phase I was balanced by consistency in emergent teacher-leadership. Two teacher-leaders became primary change facilitators. They did this, however, without position power, in fact, in spite of many conditions, events and actions that normally would negate power among peers. Their power came instead from the congruency and integrity of their actions, the consistency of their focus on student learning as the true center. The more centered their actions, the more compelling was the strange attractor: the belief among the school community that together they could actually make a difference in a student's life.

Athletic Coaches as Change Facilitators

The teacher-leaders, during Phase I, the years of the school's greatest upheaval, were athletic coaches as well as classroom teachers. Their experiences as athletic coaches may have contributed in a large way to their ability to facilitate the movement through this difficult phase and is worth further study for its important implications for future school change initiatives. As successful athletic coaches, they each had certain skills and abilities, tendencies and inclinations that worked together to further the change process in Phase I. The following is a discussion of some of the tendencies that were attributed to the teacher-leaders by interviewees at Hunter Hills.

Good coaches are big picture people, system-thinkers. They regularly work towards a long-term vision while attending to short-term goals. They are skilled at clarifying a vision for the team, getting others to see

and buy into that vision and checking performance against that vision often. Athletic coaches are skilled in the process of continuous improvement. It is the foundation of their work. They are goal-oriented and skilled at keeping the focus of the group on the team's goals. They are practically obsessed with results. They assess performance daily, review results of assessments continuously, and make necessary changes immediately.

Athletic coaches are skilled at the facilitation of teams and team building; it's what their job is all about. Good coaches are program builders. They build capacity over time. They are skilled in recruitment, and can spot talent, seeing where certain people can contribute to and benefit from their programs.

Coaches use their intuition and don't ignore hunches. Coaches are observant, watchful and aware of little things that could escalate into big problems. Good coaches have a capacity to notice more and as such have what Fullan (2005) called a receptive alertness as opposed to stand back analysis. Athletic coaches are used to making difficult decisions under a lot of pressure. They often put everything on the line and are used to taking risks.

Coaches have a different kind of relationship with students and parents than most other teachers due to the emotional, physical and social aspects of the job they do. They often have a good pulse on the community. Coaches are used to being loved and hated by many at the same time. Good coaches must deal with people who are experiencing extreme emotions, and though they themselves can be hurt and disappointed, they have acquired communication and resiliency skills for this type of difficult interaction.

Coaches work with the truth and are honest about strengths and weaknesses. They don't sugar coat things, but at the same time are skilled at progressive interactions, interactions that move people and programs forward. Coaches are mentors; as such they are skilled at encouraging people to meet their personal goals and sometimes reach beyond their own goals to be the best that they can be. Coaches inspire and motivate. They build leaders.

The best coaches are humble leaders who recognize and applaud strengths of other people and teams. They are character builders, usually emphasizing honor and respect on the field, integrity, persistence, and determination. They don't give up. They typically hold high standards for themselves as well. The coaches in this case were hard workers with little egos who pushed themselves to meet the same rigorous expectations as everyone else. This led to trust among the faculty and other subgroups. Coaches instill trust

and depend on it, so trust is never taken lightly.

Coaches are also action-oriented and this was critical to the change process at Hunter Hills. It is sometimes hard for leaders to know where to start in a process as complex as organizational change, and sometimes school leaders avoid or water-down the most difficult tasks of school improvement in fear of almost certain resistance. These teacher-leaders jumped in where it seemed sensible to them and tackled the difficult times head-on.

Professional Dialogue

These teacher-leaders learned that there would never be a best time or a best entry point for the change process in a large organization, because people come to understandings at different times depending on their own personal connections. The assistant principal, for example, shared that the beginning of the movement toward change at Hunter Hills was due to issues surrounding Channel One. A parent, however, remembered preparation for accreditation as being the catalyst for change. For one teacher, the start of the transformation was the CSIP mandate and for another the catalyst was the federal SLC grant. These four factors were important to the process, but occurred in four different years. The organization, the professional learning community, it appears did not exist for individual members until the point at which the professional conversation began to make sense to them.

Conversation, professional dialogue was at the hub of change at Hunter Hills. The most consistent factor working to further change among interviewees was the work-focused talking that teachers did on a regular basis. As expressed by Sandy, “Without that nothing would have happened, nothing!” Scott was just as adamant, “Talking is the thing that made everything else possible.” Just how integral dialogue has been to this process was evident when observing how difficult it was for interviewees to even recall how the school functioned before the mechanism for on-going professional dialogue was in place. This is not surprising to Sandy who says that before a culture of collaboration was established, teachers, and she herself, viewed their teaching roles as “independent contractors.” The professional dialogue that became integral to the organization member’s new ways of working together continued to be just as vital in Phase II.

Phase II—Culture of Collaboration→ Culture of Continuous Improvement

In the second phase of the change process, a culture of collaboration was fairly established and habits

of continuous improvement became institutionalized. Collaboration at Hunter Hills was very much focused on teacher's core work processes for the purpose of increased student success. Results, better assessments and more accurate and timely data were constant concerns. There was also a dramatic expansion of shared and invested teacher-leadership representing nearly 75% of the faculty: a manifestation of power law distributions and the sensitivity to initial conditions and power law distributions. The context of the school was then conducive to change: more adaptive and flexible, and better able to cope with fluctuations, which were a natural part of their unpredictable and complex interdependent relationship with the environment. Change in this phase focused on further implementation of structural components, modifications for improvements and self-renewal.

Hunter Hills, in Phase II, benefited from a very involved, relationship-oriented instructional leader as principal. The new principal was curriculum oriented and understood well the value of the work being done by the faculty with curriculum, instruction and assessment and so was able to give added support to that effort. Hunter Hills also benefited from the wisdom of Barbara as a critical friend, illuminating for the school community things they were perhaps too close to see, such as the need to slow the pace to conserve, recoup and refocus energy while they engaged in some important preparatory work.

When Barbara came to the school she also saw clearly a need for recognition and celebration of the school community's efforts and began acting on that need despite the fact that the teacher-leaders at the school were not attention seekers. In addition to making people feel good and boosting morale, celebrating helped raise expectations, helped members see connections better, and helped increase motivation. Celebrating also offered opportunities for others to self-check, keeping the seemingly chaotic movement centered.

The new principal was also helpful in extending awareness of Hunter Hills's change process beyond the school's boundaries, impacting conditions surrounding the school, helping to institutionalize the process throughout the district, thereby providing their efforts added protection.

Her unquestionable commitment to the transformation and the congruency of her daily actions with the school's mission, "Students will graduate with the skills to be successful" was perhaps her greatest contribution, as it helped to strengthen the organization's identity and intent, deepening its sense of purpose and meaning, thereby creating a surge of energy which increased the influence of that powerful message

and fortified the compelling draw of that strange attractor—the hope of making a difference in student success.

CONCLUSIONS

Chaos theory as a theory of action and self-organization as a strategy for change could be disconcerting propositions for educational leaders; however, findings from this study make the proposal worth considering. Leading the school organization as if it were a machine, pretending that it functions in mechanistic ways has not worked. Leading the school organization as a complex living system, by not ignoring its unpredictable, non-linear characteristics seems a much more viable proposition. Findings from this study suggest that the organization as a living system will self-organize effectively if open to disconfirming data, provided with information that is shared widely, empowered with freedom to act on new information and engaged in frequent self-referencing against its clear identity and true intent. The crucial and influential task for the school leader then becomes facilitating a tightly networked organization in determining identity and intent around student achievement through collective inquiry and purposeful work and then helping members focus unwaveringly on that identity and intent. According to the findings of this study, meaning-making was more correlated with order and functionality than heavy controls. As such, the education leader interested in reculturation, which is at the heart of second-order change, must become a facilitator of teacher-led collective meaning-making opportunities.

The change process, based on chaos theory and the sciences of complexity, when applied to open social systems operating in a quantum world are full of paradoxes. One of the most intriguing, as found in this study, was that the change process in spite of its unpredictable and nonlinear complexity, was ultimately based on simplicity and natural human tendencies. The change process at Hunter Hills involved deep human emotion and an unrelenting attention to relationships and coherency: purpose and meaningfulness. This stands in sharp contrast to the century old mechanistic model of the American high school that has emphasized isolation of people and fragmentation of ideas. The result of this organic process was an adaptive and flexible organization, better able to co-evolve with its environment, better able to meet the changing needs of its student population.

The purpose of this study was to better understand the organizational change process in the American

high school. Rather than a surface-level investigation of events and actions involved in the change process, this single case study design allowed a deep exploration of these actions. The study's longitudinal aspects revealed order in the seemingly chaotic and disorderly change process at Hunter Hills in which the culture at Hunter Hills shifted from one of isolation, to collaboration and ultimately to a culture of continuous improvement.

Several aspects of leadership at the participant school suggest the need for further study regarding leadership in second-order change or transformation. With much research on organizational change today pointing to the significant role of the principal in the transformation of schools, it is intriguing that for a time the invisibility of this albeit well-experienced and progressive principal was a definite factor in the reculturation of Hunter Hills. The untrained element of leadership exhibited by the emergent teacher-leaders in this case also raises questions about the types of training that are optimal for this type of work and who we are training for these types of tasks. The subtle differences between shared leadership necessary to the functioning of school-level Professional Learning Communities, and invested leadership which suggests a greater sense of duty, responsibility and ownership—a key factor in the school community's comprehensive, school-wide, self-organization at Hunter Hills—also warrants further study.

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