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# Collective Efficacy and Collaborative Climate in Maine High Schools

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COLLECTIVE EFFICACY AND COLLABORATIVE CLIMATE  
IN MAINE HIGH SCHOOLS

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A THESIS

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August, 2000

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# COLLECTIVE EFFICACY AND COLLABORATIVE CLIMATE IN MAINE HIGH SCHOOLS

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An Abstract of the Thesis Presented  
in Partial Fulfillment of the Requirements for the  
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August, 2000

School reformers contend that a collaborative climate is conducive to effective schools. Collective efficacy is logically connected to collaborative climate and has the potential to enhance understanding of the psychosocial aspects of schools as organizations. This study's purpose was to examine the relationships among teacher efficacy, collective efficacy, and collaborative climate and to determine how, if at all, these three indicators of teacher and school effectiveness were statistically linked.

The study involved surveying 21 high schools. Teachers ( $n = 384$ ) responded to a 40-item instrument consisting of variables related to their individual and collective efficacy, sense of collegiality, beliefs in shared goals, and amount of collaborative work. Analysis involved examining descriptive statistics and correlations among variables at teacher and school levels and within schools.

Teacher-level findings indicated a moderate correlation between collective efficacy and teacher efficacy; collegiality and shared goals were strongly correlated, but both were moderately correlated with collaborative work. Further, collective efficacy was moderately correlated with collegiality and shared goals but less so with collaborative work.

School-level correlations were strong except for a weak correlation between collective efficacy and collaborative work. Collective efficacy and collaborative climate are school-level phenomena, so teachers at the schools had more common perceptions of these variables than did individual teachers. The individual nature of teacher efficacy was reinforced by the negligible associations between teacher efficacy and any of the collaborative climate variables at both the teacher and school levels. Within-school analyses proved problematic because of the small number of respondents and lack of linear relationships in some instances.

This study of high school teachers supported the notion that teacher and collective efficacy are related concepts but that they function differently and have different correlates. It also showed that collective efficacy is related to collaborative climate, specifically, shared goals and collegiality.

The results have implications for school leaders: Collective efficacy can be a powerful concept for heightening awareness of a school's capacity for organizing and

implementing effective actions to meet goals; collective efficacy is strongly associated with teachers' having shared goals; and the dynamics of collaborative climate are clearly connected to teachers' assessments of their school's collective efficacy.

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## CHAPTER I

### INTRODUCTION

We have heard the adage, "The whole is greater than the sum of its parts," but is it? As members of an organization, how aware are we of our connection to and dependence on the work of others? Do we believe, to borrow another phrase, "The chain is only as strong as its weakest link"?

Cliches abound, and cliches are often true. We are increasingly aware in this webbed and woven world of how much our organizational effectiveness is dependent on the contributions of all members--not necessarily like a well-oiled machine, more like a living organism with systems within systems and spurts of growth coupled with periods of dormancy. The collective has to matter deeply to people interested in how effective organizations work.

In one week, I read three newspaper articles related to the notion of collectivity. On September 3, 1999, *The (London) Times* reported on yet another way Japanese businesses foster collective responsibility in their employees. Like many other companies, Kyocera, the world's largest maker of silicon chips, has a Zen temple for the souls of its employees to extend their togetherness into the hereafter. The temple's inscription says, "We have given our best effort to pursue the happiness, physical and

spiritual, of all our employees.... Even when we are no longer of this world, let's get together sometimes and drink sake and have a chat just as we have done in life"(p. 10).

In the same paper, I read about a feature attraction in the Mind Zone of London's Millennium Dome—an army of leaf cutter ants from Trinidad. They are large as ants go, up to two inches long, red and hairy, and deadly to crops. At the Dome, they are working their way around a path within a futuristic building bringing chunks of green vegetation back to their nest in order to raise fungi on which they feed. A British professor and advisor to the Millennium Dome project believed so strongly in the need to highlight the "the power of collective action and thinking" that he made his participation in the project contingent on the leaf-eater ants being part of the Mind Zone (*The Times*, September 3, 1999, p. 14).

A few days later I read another piece connecting the ideals of collective responsibility to schools. According to the National Center for Educational Statistics, 17.1% of new public school teachers in America leave the profession after four years (*USA Today*, September 14, 1999, p. 7A). These enthusiastic, idealistic teachers join the ranks of the profession and leave in disillusionment because of their isolation from colleagues, lack of mentoring, and overloaded schedules. The teachers who stay have often accommodated to the culture and structure of schools and the solitude and fragmentation of their work lives.

As this piece indicates, educational leaders are increasingly aware of the power of the collective in enhancing school effectiveness. School reformers have put much faith in collaborative, supportive, and professional climates in schools to promote the kinds of change in instruction they think will make a difference in student learning (Little, 1992; Lieberman and Miller, 1992). Smart principals have created situations where teachers work together on substantive aspects of school change, that is, in the areas of curriculum, assessment, pedagogy, and policy. In such schools, the teachers are encouraged to tackle thorny issues while they are supported and encouraged by colleagues whom they know well and respect for their expertise. School restructuring efforts like the Coalition for Essential Schools, the League of Professional Schools, and the National School Reform Faculty are predicated on the idea that teacher collaboration will better serve all students. In a collaborative climate, teachers feel more and more committed to the school's mission because they have a part in shaping it, and they measure their efforts as a collective enterprise. In Maine, the Learning Results galvanize schools and school systems around clear goals and point the way for collaborative work in instruction and assessment (Commission on Secondary Education, 1998).

Researchers are struggling with ways to examine and analyze the collectivity of the school to then construct useful ways to enhance school performance and student achievement. Hoy, Tarter, and Kottcamp (1991) describe climate as the personality of a school, and school health, they say, refers to the "general well-being of the interpersonal

relationships of the organization" (p. 9). These researchers are trying to develop acceptable measures for climate and health as well as beginning to explore the inter-relationships among aspects of an open and healthy school climate. They conclude,

Health is likely a better predictor of variables linked to such functional imperatives as innovation, goal achievement, loyalty and cohesiveness. Climate is likely a better predictor of variables linked to such measures of interaction as open communication, principal authenticity, and participation in decision-making. (p. 141)

Organizational commitment describes the extent to which people identify with the organization's goals and values. It is related to sense of community and is characterized by open communication, extensive participation, common sense of purpose, and an atmosphere of trust and responsibility for the whole community (Royal & Rossi, 1999). Newmann, Rutter, and Smith (1989) point out that one could distinguish among context, culture, and ethos, but they all derive from shared perceptions, attitudes, and perspectives of the professionals in a school.

Associated with a collaborative climate is a belief that the individual teacher is part of a larger effort. Collaborative structures and processes follow the premise that together teachers are more effective than they are alone. Realizing that many social groups and organizations depend on collective effort in order to achieve goals, scholars and researchers in the area of social cognitive beliefs have begun to pursue the notion of collective efficacy. Albert Bandura, whose research has contributed importantly to

theories of collective efficacy, defines it as "a group's shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given levels of attainment" (1997, p. 477-8).

While the research path has been well-blazed, we still do not know how individual beliefs, collective beliefs, and collaborative climate interact. How are individual beliefs about effectiveness related to beliefs about the collectivity? Is collaborative climate related to both individual teacher efficacy and collective efficacy? Are certain aspects of a collaborative climate more connected to collective efficacy than others?

Collective efficacy is another way of describing school functioning, a quality of a school. It is not the same as school health or organizational commitment. But studies of these variables have deeply informed the work to be reported here. Especially valuable has been the work of researchers exploring collective efficacy (Bandura, 1997), school health (Hoy, Tarter, & Kottcamp, 1991; Hoy & Sabo, 1997), and organizational commitment (Royal & Rossi, 1999).

Looking at the school as the significant unit of change in reform efforts (Fullan, 1990), we can see that studying collective efficacy has the potential to enhance our understanding of the complexity of the psychosocial aspects of schools as organizations. To fully explore this potential, I conducted research into shared beliefs among teachers in schools to determine the relationship between individual teacher efficacy and the school's

collective efficacy, then to examine the relationship of collective efficacy to indices of collaborative climate in the school context. By investigating the correlation between teacher efficacy and collective efficacy, this study adds to the understanding of collective school efficacy begun by Bandura. I concentrated on specific aspects of collaborative climate--teacher participation in collaborative work, quality of collegial relationships, and shared goals—in order to describe more fully how these variables are associated with collective efficacy. This study provides a picture of some of the relationships among teacher efficacy, collective efficacy, and collaborative climate.

By focusing on a specific level of schooling, the high school, my study provides some useful information regarding this unfolding area of efficacy research. Much of the earlier efficacy research, including the work on collective efficacy (Bandura, 1993; Parker, 1994), has been in elementary schools. Because of the complexity of high schools and the recent focus on high schools' unique problems in Maine (Maine Commission on Secondary Education, 1998), exploring collective efficacy in such schools is particularly timely and useful. In this state, a major impetus to change was the Common Core of Learning developed in the early 1980s. This document gave rise to the more specifically focused, yet broadly developed, Maine Learning Results (MLR). The MLR are now legislated, and school systems are developing ways for their systems to carry out the law and realize the intended results. The MLR help schools define the mission and measure success.

Rather than taking a broad look at reform in high schools, the study examines some key climate variables and beliefs, especially teachers' attitudes and self-assessment of their effectiveness and the atmosphere of the schools in which they work. The study provides some important foundations for future examinations of these variables in high schools. It should help educators understand some of the influences on institutional capacity for reform.

In describing the results, I present several tests of the theory of collective efficacy and provide a basis for further study into this complex, yet important, aspect of teachers' work in schools. Specifically, the findings can help educational policymakers and professional development planners in Maine as they implement and evaluate efforts to operationalize the learning results program. The study has relevance for the larger educational community as theorists and researchers try to understand more fully the concept of collective efficacy and its potential for describing a critical aspect of effective schools.

Chapter II reviews the literature related to teacher efficacy, collective efficacy, and some aspects of collaborative climate. After enumerating the specific research questions and describing the method used for data gathering and analysis in Chapter III, I discuss the results in Chapter IV. In the final chapter, I summarize the method and results and explore implications of the findings.

## CHAPTER II

### LITERATURE REVIEW

David Tyack and Larry Cuban in their book *Tinkering Toward Utopia; A Century of Public School Reform* (1995) are optimistic about the potential for educational change in the next century. Their optimism is based on a reassuring analysis of educational reform in the twentieth century. They see many changes in schools as hybrids. Hybrids are initiatives that generally came from higher-ups--administrators, supervisors, and coordinators, but are then adapted and modified by teachers to make them their own. Even changes that didn't seem to last, they argue, had effects on the culture of schools and the way things are done.

They say, though, that the most important and effective kinds of changes in school must come from "the inside out" since teachers are the keys to reform. However, Tyack and Cuban argue, "[Teachers] need resources of time and money, practical designs for change, and collegial support" (p. 10). Educational reformers, they note, are beginning to realize that to encourage teachers to think differently about their work and to help all students reach high standards of performance, a different kind of work environment is required.

## The Context of School Change

As much as educational historians and policy analysts recognize the intransigence of the organization of schools--what Tyack and Cuban call the "grammar of schooling"--change is coming about school by school. Change is most likely to occur when several conditions prevail: the beliefs of the teachers and administrators are in sync about high expectations for achieving clear standards of performance, the people who are responsible for implementing curriculum and assessments have decision-making power about the curriculum and assessments, these key actors have time for and skill in collaboration, and the atmosphere encourages and supports investigation into various ways of reaching goals and measuring success (Meier, 1996; Talbert & McLaughlin, 1993). The lesson of successful schools is how much they must be principle-driven, but flexible and local, in responding to the needs of their clientele in implementing plans and programs (Sizer, 1995).

Educational researchers are exploring the new dynamic of schools that see themselves not as a series of attached one-room schoolhouses but as institutions that rely on the individual effort of many people who work together in critical ways to ensure desired outcomes. A promising area of investigation is the analysis of aspects of school climate as perceived by participants. One dimension of climate involves collaboration,

the extent and quality of teachers' professional interactions as well as the teachers' responsibility for decision-making about teaching and learning in the school. Researchers probe teachers' attitudes about the benefits of their work together and examine how much they feel they are concentrating on shared goals. Another way that researchers have tried to plumb the depths of school change is to gather information about teachers' collective beliefs concerning their ability to reach all children. Exploring collective efficacy in this way merges with studies of collegiality and collaboration.

One of the keys to reform, promoted early on and refined through the work of various researchers, is the idea that there is a "gestalt" (Corcoran, 1990), a framework or comprehensive plan for school improvement that radically restructures working conditions and roles for teachers. Fullan (1990) says that the school is the unit of change and organizational capacity is critical to making "institutional development in a social context" (p. 251) the agenda for reform. There may be a hierarchy of changes and conditions that improve schools (Corcoran, 1990), but essentially, improvement in schools is the result of the interaction of strong leadership, clear mission, adequate resources, involvement and commitment of the teaching staff, high expectations of student behavior and performance, a collegial climate, and respect from the community.

This is not a checklist of easily implementable, discrete items. School reform literature paints a picture of the complexity of schools as organizations and shows how

the stresses and pressures from outside and within mean that the image constantly shifts. Further, as Fullan (1990, 1996) points out, meaningful change is demonstrated in the hearts and minds of the people who work in schools, so we have to delve into teachers' attitudes and beliefs, as well as examine the climate in which they function, to analyze and understand the extent of change and the potential for sustaining it in a school.

Secondary schools with their disciplinary focus and larger size make the picture even more complicated. High school students must meet new and varied standards, and their teachers and the school are judged on how well the students perform. The need for change in high schools is most acute, too, because that is where we see more starkly the results of inequities in opportunity and achievement. Research in secondary schools emphasizes exploring school context as a way of understanding and improving the school (McLaughlin & Talbert, 1993). In high schools, the old notions of how to organize and present curriculum and the roles of the student and teacher clash with changed demands and new understanding about teaching and learning (Maine Commission on Secondary Education, 1998). Heightened expectations call for students to be more engaged and collaborative in their learning and for teachers to work together to model the process and improve their practice to help all students meet increased demands and fulfill more sophisticated outcomes.

### **The Concept of Collective Efficacy**

Albert Bandura, who has done extensive work in human behavior by fleshing out a theory of self-efficacy (1977, 1981, 1986, 1997), has expanded his investigation into collective efficacy in the last decade. Self-efficacy is distinguished from outcome expectation in that it is not just the belief that a certain effort will produce an outcome, but it is "the conviction that one can successfully execute the behavior to produce the outcome" (Bandura, 1977, p. 193). So self-efficacy motivates as well as allows one to persist at a task. Self-efficacy is a useful indicator of potential for change because of its antecedents: observation of others, encouragement or persuasion, physiological reactions to situations, and finally performance accomplishments (Bandura, 1977). Self-efficacy varies according to the interaction of these factors combined with cognitive information like the type of task, the level of perceived difficulty, and one's experience with the task. Self-efficacy has many ramifications for action and beliefs: It influences learning, decision-making, and risk-taking as well as persistence and social interactions.

Bandura notes that people conduct their lives in social groups, the strength and power of which derive from members' beliefs in their ability to organize and sustain significant change (1986, p. 449). Just like the cognitive process of analysis where an individual estimates his or her ability to do a certain task, "group functioning is the

product of the interactive and coordinative dynamics of its members" (Bandura, 1997, p. 477-8). The "interactive dynamics" function much as the data used in self-efficacy determinations; collective efficacy will influence what people choose to do, the effort they exert, and their persistence in the face of obstacles.

We can easily see what Bandura means if we think about our own membership in groups. Effectiveness depends on the skills and knowledge of the members, tasks of the group, type of leadership, level of coordination, and the group's goals and goal-setting processes. There are also the structural constraints of the organization or institution of which a group is a part. All of these factors are part of the interactive dynamics that mean the collective efficacy of the group continually changes. Collective efficacy is an "emergent group-level attribute" not just the sum of the parts.

It is deceptively simple to think of collective efficacy as an aggregation of the individual members' self-efficacy. However, in some situations, collective efficacy would be just that. These situations involve group members functioning independently, a golf team, for example, or where the tasks are such that a very talented and confident member or two can carry the entire group--a trivial pursuit team, perhaps. The emergence of collective efficacy as a separate entity from aggregated self-efficacy occurs when the tasks and purposes of the group begin to merge and when the performance depends on the skills and competence of all the members. Interdependence signifies how much the

members rely on each other to produce effective results. The members' sense of collective efficacy reflects their beliefs about how well the group can coordinate and put into action various plans to realize desired results.

Considering the variety of groups to which we all belong, we can easily see how important interdependence can be in producing outcomes. The satisfaction restaurant goers get from their entire meal depends not only on the quality of the ingredients, the creativity of the chefs, the control of the dining room by the maitre'd, and the efficiency and good humor of the wait staff, but also how well these people accommodate each other, work together, and trust in each other's competence. Individuals on both the kitchen and dining room staffs are highly interdependent.

Schools, on the other hand, involve moderate interdependence, according to Bandura (1993) who has studied teachers and schools extensively. Teachers work independently usually with groups of students alone in classrooms, so their teacher efficacy is significant to how they perform in their classrooms. Teachers are isolated from each other through much of their day and have quite a bit of autonomy in implementing curriculum, planning instruction, and creating assessments (Lortie, 1975; Little, 1990). But they function in a larger social organization where they work together, to greater or lesser degrees, developing the school's curriculum, sharing responsibility for the management of students, and being accountable for the achievement of all the students in

the school. Bandura's 1993 study of the efficacy beliefs of faculties in elementary schools in a single district showed that just as teacher efficacy predicted student performance so did aggregated collective efficacy.

### **Teacher Efficacy and Its Correlates**

Definitions of teacher efficacy are predicated, to a greater or lesser extent, on Bandura's concept and theory of self-efficacy (Gibson & Dembo, 1984; Ashton & Webb, 1986; Smylie, 1988). The concept of teacher efficacy, as Bandura and other writers on the subject note, emerged from the 1977 RAND study. Specifically, two items on the RAND survey ("When it comes right down to it, a teacher really can't do much because most of a student's motivation and performance depends on his or her home environment" and "If I try really hard, I can get through to even the most difficult student") comprise the key factors of teacher efficacy.

Definitions of teacher efficacy are based on two distinct beliefs: first, teachers in general can influence student learning (a sense of professional efficacy grounded in locus of control), the second, a belief that an individual teacher considers himself or herself effective in producing that learning (a sense of personal teaching efficacy). Teacher efficacy is not static. It varies according to teaching assignment, ability level of the students, even disciplinary training of the teacher (Benz, Bradley, Alderman, & Flowers,

1992; Ross, Cousins, & Gadalla, 1996). Over the years, research in teacher efficacy has shown it to be complicated and dynamic as investigators examine related variables in a variety of contexts. Nevertheless, Gibson and Dembo (1984) say, teacher efficacy is "the extent to which teachers believe they can affect student learning" (p. 173).

Even as researchers acknowledge the complexity and multi-dimensionality of the measurement and conceptualization of teacher efficacy, they do know that there is something going on in the relationships between teacher efficacy and certain factors related to school reform, namely student achievement and capacity for teacher change. Researchers have found statistically significant positive relationships between teacher efficacy and student achievement generally (Smiley, 1988) and elementary student academic achievement as measured on reading and mathematics standardized tests (Rosenholtz, 1989). The Ashton and Webb study (1986) suggests important subject matter-specific differences in the teacher efficacy-achievement relationship.

There is evidence of some reciprocity between teacher efficacy and student achievement (Ross, 1995). Furthermore, researchers have found that within-teacher variables are moderated by between-teacher factors such as amount of experience and education, disciplinary preparation and teaching focus, gender, and amount of learning-community orientation of their school.

Several studies have noted how a teacher's sense of efficacy varies depending on his or her age and stage of professional development as well as the individual's work assignment. Pre-service teachers experience increasing personal efficacy as they progress through a teacher preparation program (Spector, 1990). Elementary teachers' beliefs about their own effectiveness and, to a much smaller extent, those of secondary teachers, evolve in the course of their teaching careers. When they enter the profession, though, elementary teachers do not have very high teacher efficacy. Gradually, they recover their confidence; however, efficacy beliefs appear never to reach their pre-service levels. (Soodak & Podell, 1997). Classroom teachers have a lower sense of efficacy than do the pre-service teachers and college faculty (Benz, Bradley, Alderman, & Flowers, 1992).

Professional development activities that promote teacher change are enhanced by teachers' beliefs in their own efficacy (Guskey, 1984, 1988; Smylie, 1988; Fritz, Miller-Heyl, Kreutzer, & MacPhee, 1995; Coladarci & Breton, 1997; Ghaith & Yaghi, 1997; Scribner, 1998). Faculty collaboration and critical colleagueship are correlated with teacher efficacy (Ashton & Webb, 1986; Rosenholtz, 1989; Louis, 1992). Teachers who express high self-efficacy experience less stress and more confidence in their ability to make a difference in

their teaching (Greenwood, Olejnik, & Parkay, 1990). Teachers with a higher sense of efficacy have greater commitment to teaching (Coladarci, 1992).

### **School Reform: Efficacy and Collaborative Climate**

Teacher efficacy is an established construct in the research literature, whereas work on collective efficacy in schools is just beginning (Tschannen-Moran, Woolfolk, Hoy & Hoy, 1998). Bandura (1993) studied elementary schools in a large school district and showed how organizations with a "moderate level of interdependence" are affected by the perceived collective efficacy of the staffs. He found that teacher longevity, race and socio-economic status of the student body affect student achievement and that the perceived collective efficacy of the staff likewise directly affects achievement. He acknowledges the reciprocity of these variables, particularly the indirect effect of student body characteristics on prior achievement and thus collective efficacy.

In his 1997 book, Bandura revisits teacher efficacy research to get at some of the psychosocial reasons for the vacillations of teacher efficacy and, thus, collective efficacy: Teachers' perceived collective efficacy fluctuates across the grades. Teachers tend to view their school's ability to teach children as fairly low at the primary grades, higher in first and second grade, but decreasing after that at successive the grade levels. This decrease affects how students manage transitions from school to school. He also found

that an older staff, in fact, produces greater academic achievement but perceives less collective efficacy. Bandura found that schools with a high proportion of socio-economically disadvantaged students have a lower sense of collective efficacy; however, if the teachers in those schools, for whatever reason, express strong collective efficacy, they produce greater student achievement than schools of similar size and socio-economic status.

The effective schools research suggests that school climate has reciprocal causation with collective efficacy in enhancing student achievement (Bandura, 1997). The amount of faculty collaboration along with strong principal leadership is important factors in shaping school climate (Corcoran, 1990; Bandura, 1997). Other scholars shed light on how collective efficacy and school climate might interact. Fuller and Izu (1986) demonstrate that a strong climate based on cohesive beliefs within the school heightens teacher and student performance. Raudenbush, Rowan, and Cheong (1992) are a little more cautious; nevertheless, their study indicates that teacher involvement in decision-making and collaboration among staff members increase self-efficacy among teachers.

Both Newmann, Rutter, and Smith (1989) and Lee, Dedrick, and Smith (1991) analyze the data from the 1982 High School and Beyond survey of high school seniors and teachers and the related Administrator and Teacher Surveys of 1984 to develop some conclusions about the relationship of communal organization and the effectiveness of

schools. Lee, Dedrick, and Smith focus on leadership issues and their relationship to control (order) and teacher efficacy. They note that the buffering provided by a strong principal who allows teachers greater autonomy in classrooms increases teacher efficacy. The delegating responsibility of principals, on the other hand, can have the opposite effect. They conjecture this effect may result from the power differential between teacher leaders and other teachers.

Newmann and his colleagues found that organizational features--notably ensuring order in schools and encouraging innovation and, to a lesser extent, administrative responsiveness--enhance teacher efficacy. They found that coordination of curriculum coupled with teachers' knowledge of what colleagues are teaching increases overall efficacy because it reduces isolation and strengthens cooperation and consensus.

Other studies also conclude that the interactive contexts of schools are vitally important in promoting change and adaptation to new ideas (Tarter, Bliss, & Hoy, 1985; Smylie, 1988; McLaughlin, 1986; Cuban, 1993; Cohn & Kottcamp, 1993; Martin, 1993; Miller, 1998). The reciprocation and interaction of variables is complex, though, because sometimes more information about new ideas and how colleagues are implementing them can instigate a downward spiral in individual teacher efficacy and thus collective efficacy (Smylie, 1993; Bandura, 1997). Research on collective efficacy demonstrates when certain organizational aspects of schools converge—high expectations of student

behavior and performance, strong principal leadership that promotes risk-taking, and collaborative interaction and collegial encouragement—student achievement improves (Hoy & Sabo, 1997).

Schools have been “restructuring” for some time now. We are able to tease out some parts of the complexity of a school’s atmosphere to explore the extent to which those reforms are associated with each other in this intricate web. Hoy and Miskel (1991) define school climate as “the relatively enduring quality of the school environment that is experienced by participants, affects their behavior, and is based on their collective perceptions of behavior in schools” (p. 221). Collaboration describes the behavior of teachers in the open and healthy (Hoy & Sabo, 1997) climate associated with school effectiveness.

The reform literature unequivocally reports that opportunities for teachers to work together on issues of practice (Little, 1992; Rosenholtz, 1989), openness and mutual trust in decision making about their work (Corcoran, 1990; Louis, 1989) and shared goals that provide clear expectations for them and their students (Fullan, 1987; Newmann, Rutter, & Smith, 1988) are critical to effective schools. If these conditions exist, they should promote a greater sense of the school’s efficacy within the teachers themselves.

## Implications for Research

We can continue to talk about and try to foster collective efficacy, but such work will not live up to the promise of the concept, as either gauge of effectiveness or variable in a cause-and-effect relationship, without some more groundwork. The latest review of literature on teacher and collective efficacy suggests directions for research into both variables. Tschannen-Moran, Woolfolk, Hoy and Hoy (1998) say that researchers need to investigate the interrelationship between teacher efficacy and collective efficacy. Among other specific areas for investigation, they recommend further study of the relationship between school climate and collective efficacy.

Bandura's intense interest in self-efficacy led him to look at organizational efficacy. He built on the vast research on teacher efficacy to explore the relationship between teachers' perceptions of their school's ability to achieve learning and their students' achievement. In setting up the rationale for such a study, he noted the moderate level of interdependence of teachers in schools. He also described some of the dynamic between teacher efficacy and collective efficacy at the school level.

Teachers operate collectively within an interactive social system rather than as isolates. The beliefs systems of staffs create school cultures that can have vitalizing or demoralizing effects on how well schools function as a social system.... School staff members who collectively judge themselves capable of promoting academic success imbue their schools with a positive atmosphere for development.... Although the level of academic progress achieved by a school largely reflects the summed contributions of teachers in their individual classrooms, schools involve

in their individual classrooms, schools involve organizational interdependencies that contribute to teachers' collective sense of efficacy. (1993, p. 141)

Bandura asked elementary teachers in 79 elementary schools to rate their school's capability to reach specific reading and mathematics achievement levels by the end of the year. His path analysis of certain characteristics of teachers (e.g., longevity) and student characteristics (e.g., socio-economic status) and their relationship to collective efficacy and student performance revealed the significant contribution of collective efficacy to a school's achievement. He went on to note how aggregated teachers' beliefs in their own efficacy functioned similarly to aggregated teachers' beliefs in their school's collective efficacy with regard to grade level (low at entry, increases until about grade 2, plummets and plateaus at grades 3-5 and then decreases at grade 6) and subjects taught (greater in reading than in math).

Parker (1994) followed Bandura in examining the relationship among some teacher and student population characteristics, teacher efficacy, collective efficacy, and student achievement at the elementary level. She surveyed teachers at 19 schools for a total of 239 teachers asking them to project how effective they felt themselves to be and how effective they thought their schools would be at making particular gains in reading, language, and mathematics as measured by the California Test of Basic Skills. Table 1 reports her results.

Table 1: Teacher-level Intercorrelations between Self-efficacy and Collective Efficacy in Specific Learning Areas. [From Parker (1994), p. 49].

	1	2	3	4	5
<b>Self-efficacy</b>					
1. Reading					
2. Language	.85				
3. Mathematics	.85	.83			
<b>Collective-efficacy</b>					
4. Reading	.73	.71	.67		
5. Language	.74	.73	.69	.93	
6. Mathematics	.65	.61	.60	.81	.84

Note: All correlations are significantly different from zero at  $p < .001$ .

She found significant associations among the three teacher efficacy measures and the three collective efficacy measures. But she noted, "Only the correlation between mathematics self-efficacy and collective efficacy was significantly different from one ( $z = 5.20, p < .001$ )" (p. 49). She also found that teacher characteristics (e.g., longevity, grade-level assignment) associated with teacher efficacy but not collective efficacy. She examined socio-economic status of student populations and its relationship to all the efficacy measures and found it associated more with collective efficacy than teacher efficacy. She established some connection between efficacy measures and achievement, but the associations were not significant when she controlled for prior academic achievement.

Both Bandura and Parker discuss their work in terms of the literature of school effectiveness. Parker, in fact, says, "Future research concerning the role of collective-efficacy in organizational performance should examine individual behaviors, attitudes, and beliefs which might serve as mediators between efficacy and performance" (p. 57). Rather than try to expand on the efficacy-achievement relationship at this point, I decided to explore some hypothesized relationships between possible "mediators" and both teacher and collective efficacy. I also move away from the attention to specific subject area measures of efficacy. I study high school teachers who generally feel responsible only for their specific subject area. I ask them to gauge their perception of the school's collective ability to meet general learning goals.

In this study, I explore the interaction of six variables in secondary schools in Maine. I look first at the relationship of teacher efficacy and collective efficacy to establish that they are measuring separate beliefs and to examine how they are associated with each other. Second, I examine specific aspects of school climate, those that relate to teachers' beliefs, attitudes, and behavior regarding collegiality and collaboration. In addition to looking at a climate composite, I also explore the relationships among the three variables that capture how often teachers interact professionally in a school and the extent to which they share similar goals and trust in and support each other in their work.

Finally, I look at the relationships among the efficacy variables and the climate variables. Based on the literature, I hypothesized a moderate to strong association between teacher efficacy and collective efficacy and a similar connection between collective efficacy and the collaborative climate variables because the climate reflects and mediates teachers' sense of the effectiveness of the school. I imagine some connections between teacher efficacy and the climate variables although I might expect them to be less strongly associated with individual than collective efficacy.

Like Bandura and Parker, I analyze the interactions at both the individual teacher level and the school level. However, their reports at the school level focus on the association between the efficacy variables and student and teacher characteristics not the relationship among the beliefs and attitudes. To attempt to delve further into how the efficacy and climate variables interact, I also describe within-school data on the variables and their correlations.

This study adds another dimension to the burgeoning research on school collective efficacy. By examining the dynamics of teacher and collective efficacy at the high school level and peering at the efficacy constructs through the lens of climate, I provide more--and perhaps sturdier--hooks on which to hang our understanding of how schools and teachers work and how they might work better.

## CHAPTER III

### METHOD

Having done three pilot studies looking at the relationship between teacher efficacy and collective efficacy and finding a moderate correlation between these two variables, I conducted a larger study to add to the understanding of collective school efficacy by investigating the correlation between teacher efficacy and collective efficacy in Maine high schools. Furthermore, I explored the connection among aspects of collaborative climate--teacher participation in collaborative work, quality of collegial relationships, and shared goal--to describe more fully how these variables are associated with teacher efficacy and collective efficacy.

#### Research Questions

Specifically, the study addressed these research questions:

Question 1. What is the relationship between teacher efficacy and collective efficacy in high schools in Maine?

In examinations of elementary schools, researchers (Bandura, 1993, 1997; Parker, 1994) found moderate to strong correlations between teachers' efficacy with regard to teaching core subjects and their collective efficacy in teaching those subjects. My study examined the relationship of those two variables (without the specific subject focus) in

high schools. Studies show that teacher efficacy is context-specific, and I compared the perception of teacher efficacy with the even more context-specific collective efficacy of a given school.

In a pilot study of high school teachers, teacher efficacy and collective efficacy were moderately correlated ( $r = .35, p < .05, n = 36$ ). After modifying the instrument I developed and eliminating some confusing items, I surveyed a middle school faculty known for its collaborative climate. The correlation coefficient between teacher efficacy and collective efficacy there was  $.71 (p < .01, n = 21)$ . In a third pilot study, I found a moderate correlation of the two variables in an elementary school ( $r = .35, n = 13$ ).

Employing the instrument that had been tested and refined, I examined a larger number of cases on which to make more definitive claims about the relationship between teacher efficacy and collective efficacy.

Question 2. What is the relationship among an array of collaborative climate variables (collegiality, shared goals, and participation in collaborative work) in Maine high schools?

It is difficult to separate out the elements of an effective school. Ideally, it is part of a comprehensive package that comprises the norms, expectations, resources, engagement, mutual respect and support, coupled with the leadership to both initiate and maintain change, that creates the community of learners Barth (1990) depicts. Since we

recognize the importance of teachers in creating and sustaining such schools, it is important to understand key climate elements that affect teachers and to explore how the variables interact. By teasing out some aspects of collaborative climate that nurture teachers' working together for the benefit of all students, I examined how high school contexts vary and built on this examination for later comparisons.

Question 3. How are collaborative climate variables associated with collective efficacy in Maine high schools?

A number of researchers have looked at the relationship of teacher efficacy and collaboration (Rosenholtz, 1989; Ross, 1995; Ross, Cousins, & Gadalla, 1996). Exploring the relationship further by looking at collective efficacy and collaborative climate was a logical extension of these investigations. Analysis of statements of teacher beliefs and perceptions that explore relationships among several variables related to collaborative climate and collective efficacy can inform the literature of collective efficacy and also school reform research.

### **Sources and Collection**

To answer these research questions, I surveyed the entire population of high school teachers in schools with grades 9-12 ( $n = 117$ ) in Maine by selecting a sample of twenty-one high schools. I consulted Pedhauzer and Schmelkin (1991). Their tables

indicated that an expected moderate correlation suggests a sample size of 15. Based on the pilot studies, I expected a moderate correlation between teacher efficacy and collective efficacy. A sample of 21 schools provided an adequate number of individual respondents, and I hoped to get a large enough percentage of respondents from at least 15 schools to use the school as the unit of analysis in some comparisons. Maine has a small, homogenous, and generally rural population. Nevertheless, the size of a school and amount of money spent per pupil vary. To ensure variability as well as representation of types of schools, I selected a sample that reflected a range of schools with varying characteristics of size and per pupil expenditure.

The most recent tabulations of schools by per pupil expenditure were based on 1996 figures. I organized a list of all high schools with grades 9-12 in the state according to size and within that categorization according to per pupil expenditure (ppe). I created a table of 9 sections (Small/Medium/Large Size by Small/Medium/Large ppe) with 13 schools in each one. I selected two schools from each slot (and three from the medium ppe by small/medium/large sections) for a total of 21 schools and 792 teachers.

Because I was studying context-specific variables and know how the tenor of schools varies from year to year and as the year progresses, I chose the timing of the study carefully. In order to comment on how teachers feel about their own work and that

of their colleagues, they must have worked together and have completed some substantial tasks, both with their students and other teachers. I felt that three-fourths of the year had to be completed. At that time, though, teachers begin to wind down their teaching and their collegial work as the end of the school year approaches, so I chose the first weeks of May 1999 for conducting the study. In Maine, this meant the weeks right after the spring break, early in the fourth quarter of the school year.

From mid-March to mid-April 1999, I contacted each sample school's principal and sought the school's participation. All principals, but two, agreed to have their teachers participate. I went back to my table and selected two other schools in the category from which these schools came. As much as I would have liked to visit each school personally, I found that it would be impossible to arrange. Going to some schools and not others, I felt, might skew results. I opted for asking principals, both orally and in writing, for permission, requesting that they distribute the questionnaires either in teachers' mailboxes or at a faculty meeting, and suggesting that they make some statement about the relevance of the study to high schools.

The questionnaire itself contained a cover letter explaining the purpose of the study and its relevance to Maine high school teachers and requesting that the individual teacher consider completing it and returning it to me. To ensure confidentiality, I enclosed a self-addressed envelope, and the respondents mailed the forms to me directly.

I attached a school code to each questionnaire for ease of categorizing responses and for compiling data on individual schools.

The schools in the study ranged in size from 124 pupils and 14 teachers to 967 pupils and 65 teachers. (The next largest school had 802 students and 70 teachers.) The mean school size was 417 pupils and 38 teachers. The per pupil expenditure ranged from \$4710.99 to \$8413.04 with a mean of \$6390.48. Of the 792 teachers surveyed, 385 responded which represents a rate of response of 49%. Of the 21 schools surveyed, 15 had a rate of response of 50% or more, so 15 schools were used in the school-level comparisons.

### **Instrumentation**

Surveys of teachers have proven to be a reliable way to collect data on their perceptions of their effectiveness and the climate in which they work. In creating the survey instrument for this study, I examined many other survey instruments designed to gauge efficacy or climate. At the heart of the instrument I constructed are the sections on teaching efficacy and collective efficacy. Appendix A contains the items used in the questionnaire.

## Teacher Efficacy and Collective Efficacy

As I indicated in the literature review, many researchers have developed and refined instruments creating measures of teachers' perceptions of general teaching efficacy and personal teaching efficacy. My study focuses on personal teaching efficacy and the items used are slight variations on the short version of the Hoy and Woolfolk questionnaire (1990). Key items in personal teaching efficacy instruments are the so-called RAND items. I included them in Part II, items 1 and 3: "If I try really hard, I can get through to even the most difficult or unmotivated students" and "The hours spent in my classroom have little influence on students compared to their home environment." The other six teaching efficacy items refer to specific aspects of the teaching-learning situation: Part II, items 2, 5, 7 instructional strategies; item 4, classroom management; and item 6, assessment. Item 8 is another version of the RAND statement having to do with results of the teacher's perseverance.

I used Bandura's (1997) definitions of collective efficacy, "a group's shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given levels of attainment" (p. 477) and, specific to schools, "that [a staff] can promote high levels of academic progress" (p. 250) to construct the collective efficacy items. I wanted to have some connection to the personal teaching efficacy items, though, so I included two items that parallel the RAND statements: Part III, item 3, "If we really

try, we can get through to even the most difficult and unmotivated students” and item 7, “The hours our students spend at school have little influence on them compared to the influence of factors outside of school.” Part III, items 1, 4, and 6 refer directly to Bandura’s definition of collective efficacy because they are statements that reflect on the individual’s sense that together the teachers can organize and execute plans to reach instructional goals. The other statements in Part III, 2, 5, and 8, reflect the second definition in that they ask respondents to assess how well they can reach achievement goals. This section contains two references (items 2 and 6) to the Maine Learning Results (MLR), specific curriculum and local and state assessment targets. The MLR provide foci for schools and school systems, so they are appropriate goals for collective effort.

### **Collaborative Climate**

Bandura (1997) describes the multi-dimensionality of school climate and posits that there is a relationship between the ethos of a school and teachers’ perceptions of collective efficacy. Other researchers have demonstrated the connection between organizational health (Hoy & Woolfolk, 1993) and organizational commitment (Newmann, Rutter, & Smith, 1989). Using their instruments as bases and investigating other types of climate questionnaires (e.g., Coladarci & Donaldson, 1989), I developed statements that got at sense of collegiality and shared goal perceptions of teachers in

schools. The organizational or structural aspects of teachers' work lives I could more easily measure by asking how much time teachers spent in various types of collaborative work.

I wanted to examine dimensions of school climate that related to teachers and their work together, i.e., the climate of collaboration. In this study, I focused on aspects of teacher's jobs that they do in combination and cooperation with other teachers. Specifically, I wanted to look at these aspects separately and also collectively to see how the amount of time teachers spent working together, the quality of their interpersonal interactions, and their commitment to shared goals associated with collective efficacy.

One dimension of collaborative climate, teacher participation in collaborative work, can be characterized as behavioral. Participation in collaborative work refers to the amount of time teachers spend interacting and sharing issues of practice with peers in formal and informal ways. In order for teachers to have a shared sense of purpose and to see themselves as part of a learning community they must have opportunities to interact (Little, 1982; Barth, 1990; Corcoran, 1990; Lee, Dedrick, & Smith, 1991; Darling-Hammond, 1997). These interactions provide occasions for teachers to engage in professional dialogue, to complete tasks they deem important to their work, and to influence policy. Meetings of teachers may encompass one or all of these purposes as

well as be either formal or informal. Collaborative work promotes skill development, allows for consensus building around shared goals, and provides professional support.

To get a picture of the various ways teachers in a school work together, I asked teachers to respond to eight statements about how much time they spent on particular kinds of collaborative activities: curriculum development, classroom management, instructional strategies, and school management. The statements also sought information about the kinds of gatherings: formal or informal meetings; small work groups, committees or whole faculty meetings.

A second dimension of collaborative climate is affective. It describes the feelings of teachers as they interact. Collegiality refers to the sense of teamwork or spirit of cooperation on the part of the teachers in a school. It is characterized by teachers' trust, respect, mutual support, and friendliness toward each other.

The items dealing with affective and philosophical dimensions of collaborative climate were derived from studies of school effectiveness and school health, especially Corcoran (1990); Elmore (1996); Fullan (1990); Muncey and McQuillan (1996); Rosenholtz (1989); Lee, Dedrick, and Smith (1991); Newmann, Rutter, and Smith (1989); and Hoy and Sabo (1997). In creating the ten statements that referred to feelings of collegiality, I used these verbs related to positive feelings: encourage, respect, support, accept, like, and depend on each other. I combined them with phrases that

described different aspects of the way teachers might interact, i.e., to improve their work, to innovate, to come to consensus, to seek help with a management or instructional problem, or to manage tensions around departmental or other divisions, e.g., "Teachers from one subject area respect those from other subject areas" and "Teachers in this school have integrity." I also included one very direct statement about the quality of collegiality: "We feel like a 'team' here."

A third aspect of collaborative climate is philosophical. To be productive, collaborative work must be based on shared goals, including both a clear direction and similar views of how to attain it. In effective schools, teachers have shared goals and high expectations of success for themselves and their students (Corcoran, 1990; Fullan, 1990; Glickman, 1993; MacDonald, 1996; Schlecty, 1991). A collaborative climate creates and sustains clarity and commitment to the school's goals and instructional priorities.

I developed six statements to gauge the extent to which teachers feel they share beliefs, goals and purposes with fellow teachers. One asks directly how much they share an educational philosophy and another item concerns beliefs about the capability of the students in their school. Most statements deal with the extent to which the respondents agree on the specific learning outcomes and expectations, as well as skills and attitudes, they have for their students. One statement measures how much they think they share a

vision of how to achieve the school's goals. Finally, another item involves the extent to which they believe their expectations are clear to the students in the school.

I designed the instrument so that I could break out aspects of collaborative climate and view how they associate with each other as well as with both teacher efficacy and collective efficacy. I also could aggregate the items to examine the relationship of a composite collaborative variable to teacher and collective efficacy. The instrument itself was comprised of five sections. An introductory section asked respondents for some information about years in teaching, subject area, and tenure at the particular school. The substantive sections are Parts I-IV. In Part I teachers indicated how often they have the opportunity to participate in various collaborative activities with other teachers, to create the participation in collaborative work variable. These questions were on a "Never" (1) to "Daily" (6) continuum. In Part II, the teachers responded to eight statements that dealt with their beliefs about their ability to perform the tasks of teaching as they relate to expected outcomes, teacher efficacy. These assertions, like all the rest of the statements in the questionnaire, fall on a "Strongly disagree" (1) to "Strongly agree" (6) continuum. In Part III, teachers responded to eight parallel statements that indicated teachers' beliefs about the capacity of the school's faculty to reach desired outcomes, that is, collective efficacy. And in Part IV, teachers indicate their level of agreement with sixteen statements about the other two dimensions of collaborative climate, collegiality and

shared goals. Part IV consists of statements (Items 1, 3, 4, 6, 7, 10, 11, 12, 14, 16) regarding teachers' perceptions of their faculty's collegiality. Items 2, 5, 8, 9, 13, 15 comprise the shared goals variable.

### **Reliability of the Instrument**

I generated consistently acceptable reliability coefficients for the efficacy variables in all three pilot studies. To check reliability of the instrument in the present study, I examined item-total correlations and Cronbach's alpha for reliability of the total efficacy instrument (Parts II and III), Teacher Efficacy (Part II), and Collective Efficacy (Part III). Based on these results, I recoded the negatively stated items and yielded these results: teacher efficacy,  $\alpha = .60$ ; collective efficacy,  $\alpha = .64$ ; total efficacy,  $\alpha = .72$ .

Just as with the teacher efficacy and collective efficacy variables, I clustered the responses as indicated above to create three separate variables: perceptions of collegiality (COLLEG), shared goals (GOALS), and amount of collaborative work (WORK) as well as an aggregate of all three of them called climate composite (CC). I examined the reliability of the climate composite items, Parts I and IV. I recoded the negatively stated items, and produced these reliability coefficients: climate composite,  $\alpha = .92$ ; collegiality,  $\alpha = .89$ ; shared goals,  $\alpha = .83$ ; and amount of time spent in collaborative work,  $\alpha = .81$ . Appendix B reports reliability statistics for all of the variables.

## Analysis

Having established that the variables were reasonably reliable, I proceeded to generate descriptive data about the sample population and then analyzed the data on the variables using the research questions as guides.

Question 1. What is the relationship between teacher efficacy and collective efficacy in high schools in Maine?

a) What is the correlation of teacher efficacy with collective efficacy among high school teachers? This question involved correlating the means of the teacher efficacy variable and collective efficacy variable for all cases in the study. To further the theory-building of collective efficacy as a separate entity from teacher efficacy, it was important to see these two variables as correlated but not so closely that they were indistinguishable.

b) With schools as the unit of analysis, what is the correlation of teacher efficacy and collective efficacy? In order to do analyses using the school as the unit of analysis as well as examine how the variables within schools cohere, I selected the responses from teachers at schools with a greater than 50% rate of response to the survey, a total of 15 schools. I created new variables to represent the aggregation by school of the variables I

am studying. Using the aggregated variables, I examined the relationships of the variables across schools.

The next step in examining the relationship of teacher efficacy and collective efficacy was to compute the correlation of the means of these variables from each school. This is an important step in establishing collective efficacy as a school level characteristic representing collective beliefs about the school context not simply the aggregation of the teacher efficacy beliefs.

c) Within each school, what is the correlation between teacher efficacy and collective efficacy? This questions gets at another step in the analysis of the relationship between collective efficacy and teacher efficacy. It is part of the exploration of collective efficacy as a group-level attribute rather than simply the sum of staff members' efficacy as teachers. Having selected the 15 schools to be part of the in-depth analysis across schools, I grouped the responses by school and examined the within-school data on these variables, including the correlation between teacher efficacy and collective efficacy. I also examined the scatter plots of the correlations for each school to see if they suggested non-linear relationships.

Question 2. What is the relationship among an array of collaborative climate variables (collegiality, shared goals, and participation in collaborative work) in Maine high schools?

As described in the instrumentation section, I clustered items and created four variables for each case. Two of the climate variables, collegiality and shared goals, consisted of aggregated scores of items on Likert scales like the one used for the efficacy variables where respondents indicated their degree of agreement with a statement on a scale of 1 (Strongly disagree) to 6 (Strongly agree). The collaborative work variable, though, involved a cluster of scores on items that asked specific questions about how much time teachers spent in a particular type of collaborative activity, e.g., how often do teachers gather as a faculty to discuss professional matters? Never (1); no more than 4 times/year (2); monthly (3); 2-3 times/month (4); weekly or biweekly (5); or daily (6). The work variable was on a different scale from the collegiality and shared goals variables; nevertheless, I aggregated the scores to create a composite climate variable.

a) How do the collaborative climate variables compare and how do they correlate at the teacher level? In examining the relationship among an array of collaborative climate variables (collegiality, shared goals, and participation in collaborative work), I

compared the means of the variables as well as their standard deviations. I then compared the aggregated total collaborative climate with the parts of the composite. I also examined the interrelationship of the three collaborative variables themselves. Just as in the teacher-level analyses of teacher efficacy and collective efficacy, I computed correlation coefficients for these variables.

b) Using schools as the unit of analysis, what is the correlation among these variables? To investigate the relationship among the three dimensions of collaborative climate, I computed correlations of the mean scores for each of these variables aggregated by school.

c) Within each school, what is the correlation among the collaborative climate variables? How do these correlations compare? Just as in Question 1 (c), this question gets at another step in the analysis of the relationship among the variables. It involved separating out the data by school and computing the correlations of the means of the collaborative climate variables in each school to create a picture of the interrelationship of the variables within each one.

Question 3. How are collaborative climate variables associated with collective efficacy in Maine high schools?

a) How do the collaborative climate variables correlate with collective efficacy at the teacher level? This is an important brick in the theory-building of the relationship of

collaborative climate and collective efficacy. With the teacher as the unit of analysis, I created correlation matrices of the collaborative climate variables (the climate composite as well as its components—collegiality, shared goals, and collaborative work) and collective efficacy. For comparison purposes, I also examined the relationship of teacher efficacy to the variables at each level of analysis.

b) Using schools as the unit of analysis, what is the correlation among these variables? Just as in Question 1 (b) and Question 2 (b), I examined the relationship among the collaborative climate variables and collective efficacy by computing the correlations of the mean scores for each of these variables aggregated by school.

c) Within each school, what is the correlation among the collaborative climate variables and collective efficacy? How do these correlations compare? This question and the accompanying analyses paralleled Question 1(c) and Question 2(c). It involved computing the correlation of the means of the variables within each school to create a picture of the interrelationship among them on a school-by-school basis. The data added depth to the teacher-level and school-level correlations.

### Summary

To investigate the relationship of teacher efficacy and collective efficacy and also to examine connections of collective efficacy with aspects of collaborative climate in

high schools, I created a questionnaire of 40 statements. Eight statements related to teacher efficacy; eight to collective efficacy; eight to how teachers actually work together, ten to perceptions of collegiality, and six to perceptions of shared goals.

Teachers responded to the items based on their beliefs and perceptions the time spent in formal or informal work structures of their particular school.

I surveyed teachers at 21 Maine high schools in May 1999, garnering a rate of response of 49%. More than 50% of the teachers at 15 high schools responded. I report results of the examination of relationships among variables at the teacher level, school level, and within schools. Chapter IV reports the results of these analyses, and Chapter V discusses the implications of the results.

## CHAPTER IV

### RESULTS

I begin with a description of the sample, after which I explore the basic question of the relationship between teacher efficacy and collective efficacy at the individual teacher level and at the school level. Then I examine the relationship of collaborative climate variables at both the teacher level and the school level. Finally, I attempt to answer the last research question regarding the association between collective efficacy and such aspects of collaborative climate as amount of shared work, sense of collegiality, and congruity of goals.

#### Description of the Sample

In May 1999, approximately 792 teachers at 21 Maine high schools received the Teacher Survey. Three hundred eighty-four teachers completed and returned the survey within the month, a response rate of 48%. The mean years of experience of the entire sample was 16.92 years with a range of 1 to 38 years. Of the 15 schools in the sample whose response rate was over 50%, the mean years of experience within each school ranged from a low of 14.18 to a high of 20.08. The mean number of years teachers had been at the school where they were presently teaching was 11.59 with a range of .5 to 36.5 years. The individual school means ranged from 9.72 to 14.17 years.

The respondents were, on average, career teachers who had 17 years of experience and had been teaching at their schools for about 12 years. The characteristics of the teachers in individual schools vary little from this norm. The entire sample ( $n = 384$ ) varied little in any of these categories from the teachers in the schools selected for more in-depth comparisons, i.e., schools where more than half the teachers responded to the survey ( $n = 309$ ). Appendix C contains compilations of data of the entire sample.

## The Relationship Between Teacher Efficacy and Collective Efficacy

My first research question concerned the relationship between teacher efficacy and collective efficacy. The following discussion looks at the question from three different levels: teacher level, school level, and within-school level. Before I discuss the correlation between teacher efficacy and collective efficacy at each level, I describe the sample in terms of these variables.

### Teacher-Level Results

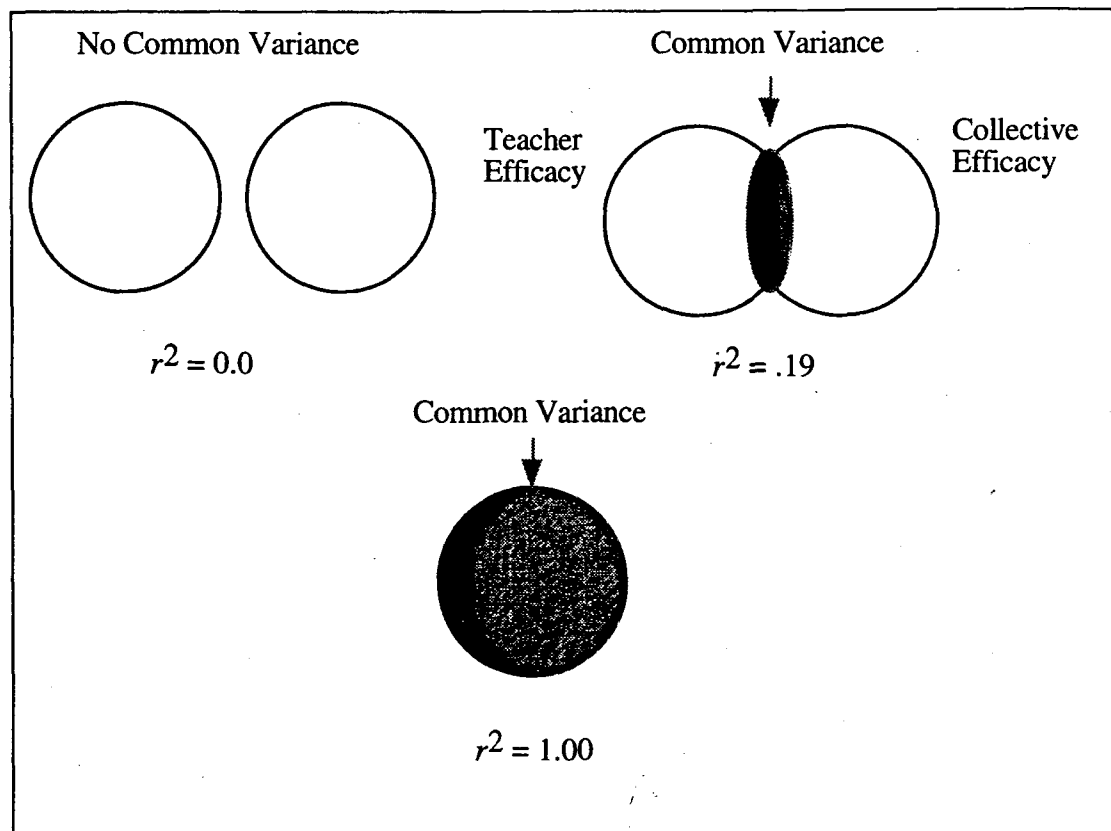
In the entire sample of high school teachers, the mean of teacher efficacy was 4.2 (on a 6-point scale, where 6 refers to "strong agreement" and 1 refers to "strong disagreement"). The average response, then, was slight agreement with statements regarding beliefs about an individual teacher's ability to affect student learning. The collective efficacy mean was not dissimilar: 4.05. Essentially, teachers tended to agree that their faculties can affect student learning.

I found a significant correlation between teacher efficacy and collective efficacy ( $r = .44, p < .01, n = 384$ ) at the teacher level. This relationship was similar to what I found in the pilot study of high schools. Another way of thinking about the strength of the teacher efficacy /collective efficacy relationship is to look at the coefficient of determination of the relationship ( $r^2 = .19$ ). It indicates roughly 20% of the variation in perceptions regarding collective efficacy and teacher efficacy was shared or common variation.

To elaborate on this concept more fully, I paraphrase the discussion and adapt an illustration from Minimum, Clarke, and Coladarci's *Elements of Statistical Reasoning* (1999). The coefficient of determination, or  $r^2$ , indicates the proportion of common variance two variables share. If  $r^2$  were zero, there would be no variance in common. In this case,  $r^2$  is .19, so about 20% of the variance of each variable overlaps the other, but 80% of the variance is associated with other factors not related to the other variable in the relationship. The .80 is the "coefficient of nondetermination." So an indicator of the

strength of the relationship between teacher efficacy and collective efficacy is the extent to which they have variation in common. At the teacher level, teacher efficacy and collective efficacy share 19% of their variation.

**Figure 1: Illustrations of Proportions of Common Variance as Indicated by the Coefficient of Determination.** [Based on figure 7.8, Minimum, Clarke, and Colardarci (1999), p.125].



### School-Level Results

Since I hypothesized that collective efficacy and collaborative climate were school-level phenomena, I also analyzed these data using the school as the unit of analysis. The 15 schools with a response rate of 50% or more were used for these analyses.

When I examined the means of all the teachers at the 15 schools that had a sufficient response rate, I found the means for the efficacy variables were almost identical to the teacher-level means: 4.21 for teacher efficacy and 4.04 for collective efficacy. The

respondents had slightly positive feelings with regard to their effectiveness as teachers and the overall effectiveness of their schools.

At the school level, the correlation between teacher efficacy and collective efficacy was .64 ( $p < .05$ ,  $n = 15$ ). This correlation was greater than the teacher-level correlation ( $r = .44$ ,  $n = 384$ ) and indicated that roughly 40% of the variance in the two variables was shared variance.

### **Within-School Results**

I found some variation across schools when I examined the within-school relationship of teacher efficacy and collective efficacy. Table 2 describes summary statistics with regard to teacher efficacy and collective efficacy at the teacher-level, the school-level, and within-school level. Teacher efficacy means ranged from 3.9 to 4.44, and collective efficacy ranged from 3.41 to 5.0. The respondents at the schools varied more on collective efficacy. Mean teachers' responses at the schools ranged from "slight disagreement" with statements reflecting collective efficacy to "moderate agreement" with such statements.

Table 2: Descriptive Statistics of Teacher Efficacy and Collective Efficacy at the Teacher-level, School-level, and Within Selected Schools.

	Teacher Efficacy			Collective Efficacy	
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Teacher-level	384	4.20	.57	4.05	.72
School-level	15	4.21	.16	4.04	.37
Within Schools					
School 18	11	4.43	.61	<u>5.0</u>	<u>.37</u>
School 11	19	4.38	<u>.40</u>	4.39	.58
School 19	13	4.14	.59	4.24	.57
School 23	41	4.16	<u>.82</u>	4.16	.81
School 8	19	<u>4.44</u>	.56	4.13	.65
School 12	22	4.28	.57	4.13	.69
School 21	14	4.13	.59	4.13	.55
School 2	33	4.12	.47	4.05	.63
School 17	11	4.36	.41	3.97	.49
School 20	15	4.19	.44	3.92	.60
School 14	20	4.06	.48	3.86	.64
School 1	29	4.24	.45	3.78	.65
School 10	14	4.35	.46	3.76	.71
School 3	34	3.97	.52	3.63	.75
School 7	12	<u>3.90</u>	.71	<u>3.41</u>	<u>.99</u>

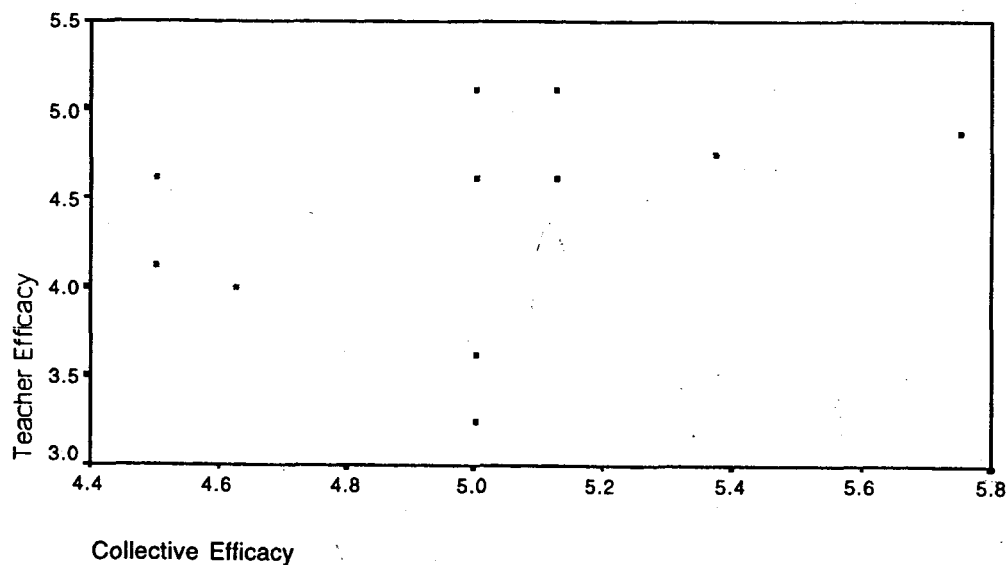
Note: The schools are listed in descending order of their collective efficacy.

Underline = lowest in category; double underline = highest in category.

The schools that emerged at the extremes of the group were School 7, with the lowest means of both teacher efficacy and collective efficacy and the largest standard deviation of collective efficacy, and School 18, which had the highest mean collective efficacy along with the smallest standard deviation of collective efficacy. School 3's statistics were quite similar to School 7, but no school came very close to School 18 at the high end of collective efficacy.

I examined each school's scatterplot of the correlation between collective efficacy and teacher efficacy. School 18's scatterplot revealed a non-linear relationship as depicted by Figure 2.

Figure 2: Scatterplot of the Correlation between Collective Efficacy and Teacher Efficacy at School 18.



School 17's scatterplot was likewise non-linear. Figure 3 represents School 2's scatterplot for the collective efficacy-teacher efficacy relationship. It revealed an outlier that would affect the correlation coefficient.

Figure 3: Scatterplot of the Correlation between Collective Efficacy and Teacher Efficacy at School 2.

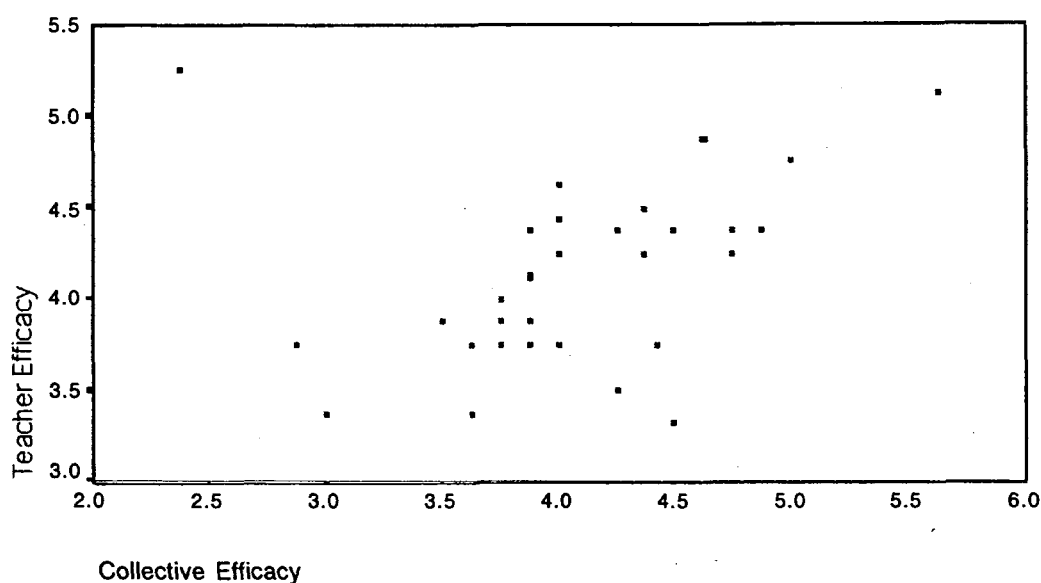


Table 3 shows the relationship between teacher efficacy and collective efficacy at the teacher-level, the school-level, and within twelve of the schools. The correlations ranged from a negligible .07 in School 10 ( $n = 12$ ) to a robust .72 in School 19 ( $p < .01$ ,  $n = 13$ ). In keeping with the teacher-level correlations, seven of the schools had correlations ranging from .32 to .49. Three schools had much higher correlations (School 7:  $r = .63$ ,  $p < .05$ ,  $n = 12$ ; School 23:  $r = .64$ ,  $p < .01$ ,  $n = 41$ ; School 19:  $r = .72$ ,  $p < .01$ ,  $n = 13$ ), and two had much lower correlations (School 10:  $r = .07$ ,  $n = 14$ ; and School 12:  $r = .19$ ,  $n = 22$ ). The schools with middle-of-the-range collective efficacy had low to moderate correlations between collective efficacy and teacher efficacy.

Table 3: Correlations of Teacher Efficacy with Collective Efficacy, Teacher-level, School-level, and Within Selected Schools.

	<i>n</i>	Rate of Response	Correlation between Teacher Efficacy and Collective Efficacy
Teacher-level	384	48%	.44**
School-level	15	71%	.64*
Within Schools			
School 11	19	54%	.32
School 19	13	54%	<u>.72</u> **
School 23	41	59%	.64**
School 8	19	57%	.36
School 12	22	58%	.19
School 21	14	58%	.35
School 20	15	63%	.43
School 14	20	67%	.49*
School 1	29	58%	.41**
School 10	14	56%	<u>.07</u>
School 3	34	52%	.41*
School 7	12	50%	.63*

**Note:** The schools are listed in descending order of their collective efficacy.

Underline = lowest in category; double underline = highest in category.

\* $p < .05$ . \*\*  $p < .01$ .

The within-school data provided some interesting counterpoints. School 7 had the lowest means of both teacher efficacy and collective efficacy (3.9 and 3.4, respectively), but a high correlation of the two ( $r = .63, p < .05, n = 12$ ). Another school (School 10) with a low mean of collective efficacy (3.76) but a relatively high mean of teacher efficacy (4.35) showed almost no correlation of the two variables ( $r = .07, n = 14$ ). In contrast, School 12, with relatively high efficacy means (4.28, teacher efficacy; 4.13, collective efficacy) was the other school with a negligible correlation of the variables ( $r = .19, n = 22$ ). School 19 with high means of the efficacy variables (4.14, teacher efficacy; 4.24, collective efficacy) had the highest correlation between the two variables ( $r = .72, p < .01, n = 13$ ). The majority of schools fall in the category of moderate correlation of the efficacy variables, but these four schools constitute the extremes and serve to highlight the various patterns of relationships of these variables within the schools in the study.

### **Summary: The Teacher Efficacy-Collective Efficacy Relationship**

At all levels of analysis, average responses for teacher efficacy and collective efficacy were just slightly higher than the middle of the scale. The average response across the 15 schools was similar to that at the teacher level, a little to the right of the middle of the scale. That is, the teachers agreed, although not "strongly" or even "moderately," that they felt the faculties at their schools were effective with all students and could produce achievement levels expected of them. Within the schools, the teachers generally felt collectively efficacious, although five schools were below the average collective efficacy mean for teachers and schools and only three schools were above it.

Correlational analyses showed that there was a moderate association between teacher efficacy and collective efficacy at the teacher level. Correlations at the school level were stronger, such that, with the school as the unit of analysis, about 40% of the variation in each variable was shared. Within the schools, the great majority showed a moderate correlation of teacher efficacy and collective efficacy, but there were extremes: In some

schools the relationship was almost non-existent and in others was very strong. The schools representing the extremes of the sample, those with high or low teacher or collective efficacy and with high or low correlations of these variables, bear further examination in the relationship of the efficacy variables to the climate variables in schools.

### **Relationships Among the Collaborative Climate Variables**

The second research question involved the context of schools, specifically teachers' perceptions of and experiences with what school reformers refer to as "collaborative climate." I was interested in how teachers felt about each other, perceived their goals to be aligned, and described working together. I analyzed collaborative climate from three dimensions:

- *Affective*: How collegial are the teachers in the schools?
- *Philosophical*: To what extent do the teachers feel they share similar beliefs and purposes about teaching and managing the students in the school?
- *Behavioral*: How much time do teachers spend working closely with fellow teachers developing curriculum and designing instruction?

I first examine the statistics associated with the three collaborative climate variables and the composite climate variable, an aggregate of the other three climate variables. I then discuss the relationships among the variables at the three levels of analysis.

### **Teacher-Level Results**

Table 4 reports the means and standard deviations of the three variables and their composite for the entire sample of teachers.

Table 4: Teacher-level Statistics of Collaborative Climate Variables. ( $n = 384$ )

	<i>M</i>	<i>SD</i>
Collegiality	4.67	.85
Shared Goals	4.17	.90
Collaborative Work	2.95	.79
Climate Composite	3.97	.70

These data suggest that teachers feel most positively about collegiality: Teachers agreed that they liked and respected each other ( $M = 4.67$ ). The shared goals mean ( $M = 4.17$ ) reflects a generally positive sense that the teachers shared similar aims and purposes for the achievement of the students in the school. Respondents, on average, “agreed slightly” with the statements that comprised these two variables. The mean of the collaborative work variable ( $M = 2.95$ ) indicated that teachers, on average, met monthly or perhaps a little less often in various groups to discuss issues of practice and curriculum.

Table 5 depicts the correlations among the climate variables. Teachers’ sense of collegiality and perceptions of shared goals were closely related ( $r = .74, p < .01, n = 384$ ). However, each variable is only moderately, if significantly, associated with the amount of time teachers said they spent in collaborative work ( $r_s = .44$ , and  $.42$ , respectively). These data demonstrated that the three aspects of collaborative climate are related. However, there was less of a correlation between amount of time teachers spent working together and either their feelings of collegiality or their sense of common purpose than there was between collegiality and shared goals. At the teacher-level, more than half of the variation between collegial feelings and unity of purpose was shared ( $r^2 = .55$ ), but less than one fifth of the variation was shared between collaborative work and either collegiality or shared goals ( $r^2$ s =  $.19$  and  $.18$ , respectively).

Table 5: Teacher-level Interrelations of Climate Variables. ( $n = 384$ )

	Collegiality	Shared Goals	Collaborative Work
Climate Composite	.91**	.84**	.73**
Collegiality		.74**	.44**
Shared Goals			.42**

\* $p < .05$ . \*\*  $p < .01$ .

### School-Level Results

The school-level correlations across the climate variables, like those of the efficacy variables, were stronger than those at the teacher level. Table 6 displays the correlations among the collaborative climate variables aggregated at the school level. The three climate variables, understandably, correlated strongly with the composite variable. There was a strong connection between collegiality and shared goals ( $r = .85$ ,  $p < .01$ ,  $n = 15$ ). The correlation between shared goals and amount of collaborative work remained at a moderate level ( $r = .41$ ), but I found a much stronger correlation of collegiality and amount of collaborative work here than I did at the teacher level:  $r = .76$  versus  $r = .44$ .

Table 6: School-level Interrelations of Climate Variables. ( $n = 15$ )

	Collegiality	Shared Goals	Collaborative Work
Climate Composite	.96**	.79**	.63*
Collegiality		.85**	.76**
Shared Goals			.41

$p < .05$ . \*\*  $p < .01$ .

## Within-School Results

I examined the descriptive statistics of the 15 selected schools to see if any pattern of relationships among aspects of the collaborative climate emerged. Table 7 compares the teacher-level statistics to those at the school-level as well as within schools. Teacher-level and school-level means were similar for all variables.

The data reveal some variation among the climate variables across the schools. The mean of the composite ranged from 2.80 to 4.48. Within the schools, teachers varied most with regard to how collegial they felt. Mean collegiality ranged from 3.08 to 5.28. Teachers' sense of shared goals also showed a large variation. Means ranged from 3.12 to 5.18. Teachers appear to be spending little time in collaborative work. The amount of time teachers in schools met professionally ranged from a little more often than 4 times a year to close to bimonthly. At most of the schools, teachers met monthly or less often. The shared work variable had the smallest range of standard deviations compared to the other two variables, .45 to .93. The ranges of standard deviations of the other two variables were .33 to 1.17 for collegiality and .56 to 1.21 for shared goals. The standard deviations show the degree of consensus regarding each of these variables among the teachers within the schools. The teachers had less agreement in their perceptions when it came to beliefs about collegiality and shared goals than they had regarding the amount of time spent working together.

By listing the schools in order of their collective efficacy in Table 7, I can see some tendencies emerge. With the glaring exceptions of School 19 and School 7, the collective efficacy of the schools generally parallels the climate composite: Schools high in collective efficacy tend to be high in climate and vice versa. This tendency more or less holds true in the other categories, although there are exceptions in every instance. Schools 19 and 7, in fact, follow the collective efficacy pattern with regard to shared goals although they do not with regard to the other variables.

Table 7: Descriptive Statistics of the Climate Variables at the Teacher-level, School-level, and Within Selected Schools.

	<i>n</i>	Climate Composite		Collegiality		Shared Goals		Collaborative Work	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Teacher-Level	384	3.97	.70	4.67	.85	4.17	.90	2.95	.79
School-Level	15	4.55	.51	3.88	.40	4.08	.47	2.90	.36
Within Schools									
School 18	11	<u>4.48</u>	<u>.26</u>	<u>5.28</u>	.42	<u>5.18</u>	<u>.56</u>	2.98	.74
School 11	19	4.38	.58	4.91	.68	4.34	.79	<u>3.76</u>	.62
School 19	13	3.78	<u>.94</u>	4.42	<u>1.17</u>	4.31	1.06	2.60	.79
School 23	41	4.09	.57	4.86	.69	4.25	.86	3.05	.69
School 8	19	3.94	.55	4.68	.57	4.33	.80	2.73	<u>.93</u>
School 12	22	4.09	.66	5.03	.84	4.26	.93	2.79	<u>.45</u>
School 21	14	4.01	.71	4.74	.83	4.13	.91	3.02	.65
School 2	33	4.08	.53	4.61	.59	4.29	.77	3.27	.73
School 17	11	3.61	.75	4.4	.65	3.79	1.16	2.5	.90
School 20	15	3.91	.39	4.73	<u>.33</u>	3.6	.62	3.12	.78
School 14	20	3.61	.68	4.20	.88	3.84	.72	2.69	.71
School 1	29	3.53	.53	4.02	.60	3.59	.78	2.88	.72
School 10	14	<u>2.80</u>	.88	<u>3.08</u>	1.11	<u>3.12</u>	1.15	<u>2.22</u>	<u>.72</u>
School 3	34	3.91	.60	4.5	.71	4.32	.67	2.87	.74
School 7	12	4.02	.86	4.85	.92	3.93	<u>1.21</u>	3.02	.79

Note: Schools listed in descending order of their collective efficacy. Underline = lowest in category; double underline = highest in category

Just as in the efficacy correlations, scatterplots revealed non-linearity of correlations in Schools 17 and 18 and an outlier in the shared goals-collaborative work correlation of School 2. Table 8 depicts the within-school inter-correlations of the climate variables at the 12 schools selected for examination of the efficacy correlations. Most of these correlations were in the high range. The most striking result of these comparisons was the number of schools with solid connections between collegiality and shared goals. The coefficients of determination ( $r^2$ ) showed that, in all but one school, the common variation between feelings of collegiality and sense of shared goals was more than one-third. Seven schools had moderate to high correlations between collegial feelings and amount of collaborative work. Six schools had shared variation of collegiality and collaborative work of 30% or more. Eight of the 12 schools had moderate to high correlations of shared goals with amount of collaborative work, with seven schools indicating shared variation of these variables of at least 30%.

Of the schools that represented the extremes in terms of means and correlations of the efficacy variables, School 10, which had the lowest averages on all the collaborative climate variables and a weak connection between collective efficacy and teacher efficacy, displayed moderate to strong correlations among the three climate variables. Similarly, at School 12, there was a low correlation between collective efficacy and teacher efficacy but very strong correlations among the climate variables. The schools that had high collective efficacy-teacher efficacy correlations (Schools 7 and 19) also had high correlations among the climate variables. For more detail, see Appendix D for correlations within all the schools.

Table 8: Intercorrelations of the Climate Variables at the Teacher-level, School-level and Within 12 Schools.

	<i>n</i>	Collegiality and Collaborative Work	Collegiality and Shared Goals	Shared Goals and Collaborative Work
Teacher-level	384	.44**	.74**	.42**
School-level	15	.76**	.85**	.41
Within Schools				
School 11	19	.48*	.63**	.56**
School 19	13	<u>.76**</u>	.85**	.63**
School 23	41	.29*	.63**	.29*
School 8	19	.24	.58**	.30
School 12	22	.66**	<u>.89**</u>	.47*
School 21	14	.58*	.85**	.62*
School 20	15	<u>.11</u>	<u>.48</u>	<u>.14</u>
School 14	20	.56**	.61**	.56**
School 1	29	.34*	.62**	.27
School 10	14	.44	.83**	<u>.76**</u>
School 3	34	.46**	.66**	.59**
School 7	12	.66**	.84**	.66**

Note: Schools are listed in descending order of their collective efficacy.

Underline = lowest in category; double underline = highest in category.

\* $p < .05$ . \*\*  $p < .01$ .

The strong association between collegiality and shared goals and the generally solid associations between those two variables and amount of time spent in collaborative work prompted me to examine the work variable more closely. Four items that comprised the work variable have to do with formal meetings of teachers and four items concern informal gatherings. I wondered if there was a difference in the relationships between the amount of time spent in informal meetings versus that spent in formal meetings and either collegiality or shared goals.

Table 9 depicts the means for formal and informal work and correlations of those variables with collegiality and shared goals in 12 schools as well as at the teacher-level and school-level. The teacher level means for amount of time spent in formal work versus time in informal work were 2.68 and 3.23, respectively. At the teacher-level, the correlation between collegial feelings and time spent in formal work was .31 ( $p < .01$ ) and collegial feelings and time spent in informal work was .43 ( $p < .01$ ). The correlations between teachers' perceptions of shared goals and formal and informal work were similar to these ( $r = .33, p < .01$  and  $r = .38, p < .01$ , respectively) although less discrepant than those between collegiality and both types of collaborative work. The school-level correlations were stronger, in keeping with relationships among all the variables at this level of analysis. At the school-level the correlation between formal work and collegiality was .63 ( $p < .01$ ); between informal work and collegiality, .80 ( $p < .01$ ) the relationship between shared goals and formal work was .38 ( $p > .05$ ), but between goals and informal work it was .56 ( $p < .01$ ). The results indicate that teachers spend more time in informal work together than they do in formal work, but there is no clear indication that there is a substantial difference in the relationship between and the two types of collaborative work and the other collaborative climate variables.

Table 9: Statistics on Formal Work, Informal Work, Collegiality, and Shared Goals at the Teacher-level, School-level and Within 12 Schools.

Correlations between:							
	<i>n</i>	Formal Work <i>M</i>	Informal Work <i>M</i>	Formal Work and Collegiality	Informal Work and Collegiality	Formal Work and Shared Goals	Informal Work and Shared Goals
Teacher-Level	384	2.68	3.23	.31**	.43**	.33**	.38**
School-Level	15	2.68	3.21	.63**	.80**	.38	.56**
Within Schools							
School 11	19	<u>3.82</u>	<u>3.71</u>	.37	.53*	.47*	.58**
School 19	13	2.40	2.79	<u>.71</u> *	.60*	.64*	.47
School 23	41	2.50	3.60	.09	.35*	.30*	.21
School 8	19	2.64	2.81	.29	.15	.43*	.12
School 12	22	2.30	3.28	.20	<u>.67</u> **	.12	.50**
School 21	14	2.86	3.18	.35	.52*	.37	.57*
School 20	15	3.03	3.20	<u>.08</u>	<u>.13</u>	.17	<u>.10</u>
School 14	20	2.51	2.88	.25	.61**	<u>.13</u>	<u>.65</u> **
School 1	29	2.76	3.00	.43**	.22	.37*	.16
School 10	14	<u>2.02</u>	<u>2.43</u>	.19	.53*	.55*	.80**
School 3	34	2.57	3.17	.40*	.39*	.44**	.54**
School 7	12	2.63	3.42	.54*	.63*	<u>.65</u> *	.54*

**Note:** Schools are listed in descending order of their collective efficacy.

Underline = lowest in category; double underline = highest in category.

\* $p < .05$ . \*\*  $p < .01$ .

### **Summary: Relationships Among Collaborative Climate Variables**

The teachers in the sample, on average, agreed slightly that they liked their colleagues and felt they had common goals. Regarding collaborative work, statistics indicated these teachers, on average, met monthly to interact with each other professionally. At the teacher-level, the correlational analyses of the components of collaborative climate--collegiality, shared goals, and collaborative work--showed a moderate association of amount of collaborative work with both collegiality and shared goals, whereas the latter variables were strongly correlated with each other.

The school-level analyses of the 15 schools with a greater than 50% response rate produced results similar to the teacher-level analyses. The variables' averages were about the same as those at the teacher-level. At this level, the Intercorrelations among the climate variables were generally stronger than at the teacher-level, although the shared goals and amount of collaborative work relationship remained the same. Unity of goals and collegiality showed a slightly stronger correspondence, and feelings of collegiality and amount of collaborative work appeared to have a much stronger relationship at the school-level than at the teacher-level.

The relationships among the climate variables within the schools generally followed the pattern of the other two levels of analysis. Teachers' collegial feelings and sense of shared goals had overwhelmingly strong connections at almost all of the schools. The relationship between both collegiality and shared goals and the amount of collaborative work within the schools varied considerably, and although there is evidence that informal work groups are more common than formal ones, there is not a clear indication that informal work affects either collegiality or shared goals substantially more than formal work.

These results prompt many questions about the web of relationships of the climate variables themselves. But the more relevant story is how all of these associated with

collective efficacy. There is some evidence that schools with high collective efficacy tend to have teachers who describe their schools as having a strong collaborative climate, and likewise, evidence that teachers in schools with low collective efficacy tend to describe their schools as having a weaker collaborative climate. The next section examines the correlation between the collaborative climate variables and the efficacy variables.

### **The Relationship Between Collaborative Climate and Collective Efficacy**

Research question 3 combines the two avenues of investigation, efficacy and climate, by examining the relationships among the collaborative climate variables and both teacher efficacy and collective efficacy.

### **Teacher-Level Results**

Table 10 displays the correlations among the efficacy variables and climate variables.

**Table 10: Teacher-level Interrelations of Efficacy Variables and Climate Variables.**

( $n = 384$ )

	Collective Efficacy	Climate Composite	Collegiality	Shared Goals	Collaborative Work
Teacher Efficacy	.44**	.10*	.08	.05	.08
Collective Efficacy		.38**	.33**	.36**	.23**
Climate Composite			.91**	.84**	.73**
Collegiality				.74**	.44**
Shared Goals					.42**

\* $p < .05$ . \*\* $p < .01$ .

Having found that teacher efficacy and collective efficacy were moderately correlated ( $r = .44, p < .01$ ), I noted the moderate, but less strong, association between collective efficacy and the climate composite at the teacher level ( $r = .38, p < .01$ ). There was a negligible, if statistically significant, association between teacher efficacy and the climate composite ( $r = .10, p < .05$ ). The correlation between teacher efficacy and each of the three climate variables failed to reach statistical significance. Teachers' collegial feelings and the extent to which they felt they shared common goals with other faculty correlated with collective efficacy ( $r_s = .33$  and  $.36$ , respectively). The amount of time teachers engaged in collaborative work was less strongly associated with collective efficacy than it was with the other two variables ( $r = .23, p < .01$ ). At the teacher -level, there was 14% shared variation between collective efficacy and collaborative climate indicating that 86% of the variance in the two variables can be accounted for by other factors not the association between the two.

At the teacher-level, the associations between collective efficacy and teacher efficacy and between collective efficacy and the climate composite are similar; the associations between collective efficacy and collegiality and between collective efficacy and shared goals are similar if a little less strong than the former associations. But there is almost no relationship between teacher efficacy and any of the climate variables.

## School-Level Results

Table 11 presents the school-level correlations.

Table 11: School-level Intercorrelations of Efficacy and Climate Variables. ( $n = 15$ )

	Collective Efficacy	Climate Composite	Collegiality	Shared Goals	Collaborative Work
Teacher Efficacy	.64*	-.01	.01	.14	-.09
Collective Efficacy		.50*	.56*	.73**	.26
Climate Composite			.96**	.79**	.63*
Collegiality				.85**	.76**
Shared Goals					.41

\* $p < .05$ . \*\* $p < .01$ .

The relationships were stronger at the school level than at the teacher level, and a similar pattern to school-level associations of the other variables emerged among them. I have already described how teacher efficacy and collective efficacy were more strongly associated, .64 as opposed to .44, at the school level. Collective efficacy and collaborative climate were more closely correlated at the school level also, .50 ( $p < .05$ ,  $n = 15$ ) rather than .38 ( $p < .01$ ,  $n = 384$ ). In this instance, 25% of the variance between the two variables is shared.

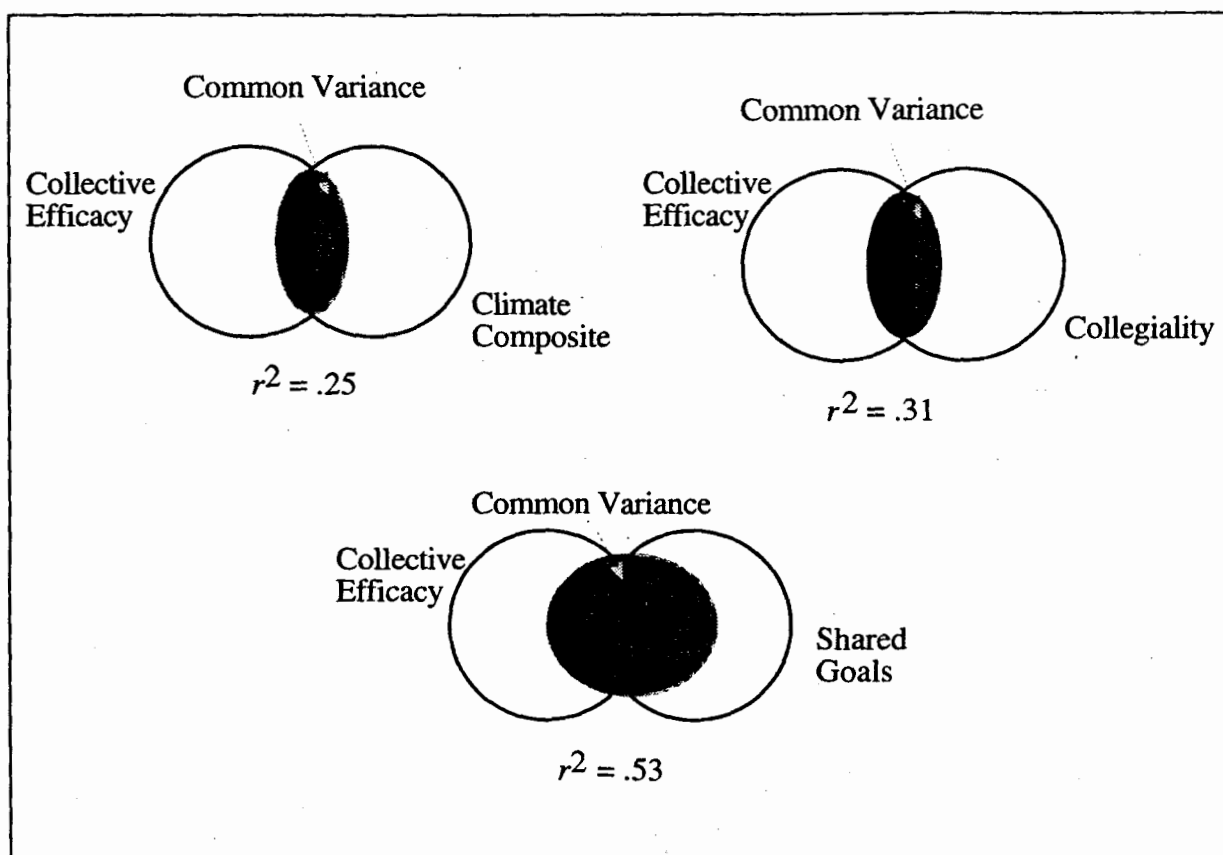
Teacher efficacy and collaborative climate were unrelated ( $r = -.01$ ,  $p > .05$ ). The results reinforced the lack of a relationship between teacher efficacy and collaborative climate as opposed to the moderate relationship between collective efficacy and collaborative climate.

In keeping with the stronger association of collective efficacy and collaborative climate across schools, collective efficacy showed a stronger connection with two of the

collaborative climate variables. The biggest change was in the correlation between collective efficacy and shared goals, from .36 ( $p < .01$ ) to .73 ( $p < .01$ ); the second strongest relationship was between collective efficacy and collegiality, increased from .33 ( $p < .01$ ) to .56 ( $p < .05$ ). The correlation between collective efficacy and collaborative work remained low at .26 ( $r^2 = .07$ ). These data paralleled the teacher-level data in showing the lack of association between teacher efficacy and the climate variables.

The varying correlations between collective efficacy and the climate variables emphasize the difference between the collaborative climate variables and collective efficacy. But the data also show that these variables represent school-level phenomena that are related to each other. The coefficients of determination of these relationships demonstrated the strength of the associations: collective efficacy and collaborative climate share one-quarter of their variance ( $r^2 = .25$ ), collective efficacy and collegiality share close to one-third of their variance ( $r^2 = .31$ ), and collective efficacy and shared goals share more than half of their variance ( $r^2 = .53$ ). To illustrate the proportion of shared variance in these associations, I again adapt the Minium, Clarke, and Coladarci (1999) figures.

Figure 4: Illustration of Proportion of Common Variance in the Correlations Between Collective Efficacy and Climate Variables. [Based on Figure 7.8, Minimum, Clarke, Coladarci (1999), p. 125.]



These statistics lead the way to further analyses of the sample of selected schools. In the next sections, I describe the results of within-school analyses of the relationships among the variables.

### Within-School Results

As much as I am interested in the school-level connections described above, I am also interested in seeing how these variables play out in individual schools. This kind of

investigation forms a vital platform from which to do more in-depth studies of how these aspects of teachers' perceptions and behavior reflect the atmosphere of the school.

The scatterplots for the collective efficacy-climate relationship and for the teacher efficacy-climate relationship at the within-school level revealed more problems than I had encountered in the other correlations. In addition to the non-linear plots in Schools 17 and 18, many schools had outliers in either or both of the efficacy-climate correlations. I had to omit seven schools from compilations of the within-school correlations between the efficacy and climate composite variables.

Table 12 shows the within-school correlations among teacher efficacy, collective efficacy and climate composite variables for eight schools. In spite of the lack of evidence of a correlation between teacher efficacy and collaborative climate at both the teacher level ( $r = .10, p < .05$ ) and the school level ( $r = -.01, p > .05$ ), the correlations between teacher efficacy and the climate composite ranged from .01 ( $p > .05$ ) in School 1 to .70 ( $p < .01$ ) in School 7. The collective efficacy-climate composite correlations had not quite so wide a range: .18 ( $p > .05$ ) in School 12 to .66 ( $p < .01$ ) in School 8.

Table 12: Correlations among Teacher Efficacy, Collective Efficacy, and Climate Composite at the Teacher-level, School-level, and Within 8 Schools.

	Teacher Efficacy and Collective Efficacy	Teacher Efficacy and Climate Composite	Collective Efficacy and Climate Composite
Teacher-level	.44**	.10*	.38**
School level	.64*	-.01	.50*
Within Schools			
School 11	.32	.28	.38
School 8	.36	.30	<u>.66**</u>
School 12	.19	-.12	<u>.18</u>
School 20	.43	-.34	.21
School 14	.49*	.47*	.46*
School 1	.41**	<u>.01</u>	.24
School 10	<u>.07</u>	.43	.28
School 7	<u>.63*</u>	<u>.70**</u>	.55*

Note: Schools are listed in descending order of their collective efficacy.

Underline = lowest in category; double underline = highest in category.

\* $p < .05$ . \*\* $p < .01$ .

The results indicated that at four of the schools, collective efficacy was at least moderately correlated with collaborative climate; shared variation between the two variables ranged from 14% to 44%. However, three schools showed fairly weak connections between collective efficacy and the collaborative climate composite. In spite of a strong relationship in School 7 ( $r = .70$ ,  $p < .01$ ), I found mostly low associations of teacher efficacy and the climate composite with the shared variation in the other schools ranging from zero to 22%.

Even though I noted a tendency of the schools to have similar patterns of collective efficacy and perceptions of collaborative climate, some of the extreme schools regarding the collective efficacy and teacher efficacy relationship followed the pattern and others did not. School 7, the school with the lowest collective efficacy actually had moderate means of most of the climate variables. Mean teacher responses at School 7 produced relatively high correlations between collective efficacy and teacher efficacy and between collective efficacy and the climate composite. School 12, with moderate means of both collective efficacy and climate, had non-significant correlations between collective efficacy and both teacher efficacy and climate. School 10's teachers, with relatively low collective efficacy and the lowest means on all the climate variables, also had non-significant correlations among all three variables.

I was interested in exploring the relationships of collective efficacy with collegiality, shared goals, and participation in collaborative work to see if they threw light on the connection of collective efficacy with collaborative climate generally. Table 13 depicts the intercorrelations of collective efficacy with the collaborative climate variables for the eight schools listed in Table 12. Appendix D provides more detail on the correlations within individual schools.

Table 13: Intercorrelations among Collective Efficacy and Climate Variables at the Teacher-level, School-level, and Within 8 Schools.

		Collective Efficacy and Collegiality	Collective Efficacy and Shared Goals	Collective Efficacy and Collaborative Work
Teacher-level	384	.33**	.36**	.23**
School-level	15	.56*	.73**	.26
<u>Within Schools</u>				
School 11	19	.14	.48*	.38
School 8	19	<u>.62**</u>	.35	<u>.51*</u>
School 12	22	.12	.17	.25
School 20	15	.24	<u>.08</u>	<u>.13</u>
School 14	20	.42*	.36	.34
School 1	29	.22	.20	.15
School 10	14	<u>.11</u>	.28	.48*
School 3	34	.41**	.39*	.25
School 7	12	.37	<u>.68**</u>	.45

**Note:** Schools are listed in descending order of their collective efficacy.

Underline = lowest in category; double underline = highest in category.

\*  $p < .05$ . \*\* $p < .01$ .

The correlations between collective efficacy and collegiality ranged from .11 ( $p > .05$ ) to .62 ( $p < .01$ ), and the correlations between collective efficacy and shared goals ranged from .08 ( $p > .05$ ) to .68 ( $p > .01$ ). Although collective efficacy correlated moderately to strongly with collegiality and shared goals at both the teacher-level and the school-level, the majority of the within-school correlations among these variables showed little or no relationship. The correlation between collective efficacy and amount of collaborative work was weak at both the teacher and school levels. The correlations

between these two variables were similarly low in most of the schools in the sample. Only two schools produced statistically significant correlations between collective efficacy and shared work, School 8 ( $r = .51, p < .05$ ) and School 10 ( $r = .48, p < .05$ ). At the other schools, the results indicated little or no correlation between amount of time teachers spent in collaborative work and the teachers' estimates of their collective efficacy.

The individual school correlations between collective efficacy and the climate variables did not produce many statistically significant relationships, so it is difficult to see if the tendency of collective efficacy to climate is borne out within the schools. To demonstrate the individual quality of the schools with regard to the general pattern, it is worthwhile to discuss in detail the "extreme" schools.

Not only was School 10's collective efficacy low, but it also had the lowest means of all three of the collaborative climate variables. At School 10, there was no statistically significant evidence of an association between collective efficacy and either collegiality or shared goals ( $r = .11$  and  $r = .28, p > .05$ , respectively) but a significant moderate association between collective efficacy and collaborative work ( $r = .48, p < .05, n = 14$ ). On the other hand, teachers at School 7 expressed the least sense that they were collectively efficacious, but they gave a fairly strong indication that they trusted and supported each other and shared common goals. This school had the strongest correlation between collective efficacy and shared goals ( $r = .68, p < .01, n = 12$ ) but non-significant correlations between collective efficacy and collegiality ( $r = .37, p > .05$ ) and participation in collaborative work ( $r = .45, p > .05$ ). Teachers at School 12, a school with moderate collective efficacy, indicated a fairly strong sense of collegiality but were more equivocal with regard to shared goals and participation in collaborative work. Mean responses at School 12 produced no statistically significant correlations between collective efficacy and any of the climate variables.

At all levels of analysis, the distinction between formal types of teacher collaboration and informal meetings of teachers did not come across clearly in the

correlations between these variables and the efficacy variables. At the teacher-level, the correlation between collective efficacy and formal work was .21 ( $p < .01$ ,  $n = 384$ ) and between collective efficacy and informal work, .19 ( $p < .01$ ). There was almost no connection between teacher efficacy and either of these variables (formal work,  $r = .09$ ,  $p < .05$ ; informal work,  $r = .05$ ,  $p > .05$ ). At the school-level, the correlation between collective efficacy and formal work was .40 ( $p > .05$ ), and between collective efficacy and informal work it was .24 ( $p > .05$ ). Appendix E summarizes the within-school means for both types of work and provides the correlations among type of work, both of the efficacy variables and the other climate variables.

### **Summary: The Relationship of Collective Efficacy and Collaborative Climate**

At the teacher level, I found a moderate association between collective efficacy and the climate composite. There was almost no correlation between teacher efficacy and climate. The correlations among the efficacy and the climate variables paralleled those among teacher efficacy, collective efficacy, and the climate composite: a moderate association between collective efficacy and the climate variables, and almost no relationship between teacher efficacy and any of the variables.

Just as in the teacher efficacy-collective efficacy relationship, school-level correlations between collective efficacy and the climate variables were stronger. Collective efficacy and the climate composite had a moderately strong connection; teacher efficacy and climate had no significant relationship.

Within the schools, correlations among the major variables covered a wide range, but almost all schools showed no significant relationship between teacher efficacy and the climate composite. The collective efficacy and collaborative climate relationship was less definite: At four schools there were moderate to strong correlations between collective

efficacy and the climate composite, but at the others there were no significant correlations between the two variables.

To examine the collective efficacy and climate relationship more fully, I looked at the means of the collaborative climate variables and their relationship to collective efficacy. The discrepancies among schools showed the unique quality of each school with regard to how the collective efficacy and collaborative climate variables interacted. Few schools produced statistically significant correlations between collective efficacy and any of the three climate variables. Analysis of the different ways teachers work together, in formal meetings or at informal work sessions, did not yield any clear distinction in how various work configurations relate to collective efficacy and teacher efficacy.

In the next chapter after summarizing the method, limitations, and results, I discuss the findings of the study. The discussion incorporates the three research questions by describing the ramifications of the teacher efficacy-collective efficacy relationship, the interconnections of some aspects of collaborative climate, and the relationships among the efficacy variables and aspects of collaborative climate. Finally, I elaborate on the findings and their implications for school improvement efforts and further research in collective efficacy.

## CHAPTER V

### DISCUSSION

Many researchers have explored teacher efficacy, finding that a teacher's sense of effectiveness makes a difference in student performance (Bandura, 1993; Ashton & Webb, 1986; Rosenholtz, 1989); parent involvement (Hoover-Dempsey, Bassler, & Brissie, 1987; Ashton & Webb, 1986); teachers' expectations of students (Gibson & Dembo, 1984); and teacher amenability to change (Guskey, 1984; 1988; Smylie, 1988; Coladarci & Breton, 1997). Teacher efficacy is affected by such things as socio-economic status of students, grade level of students, even the subject matter taught (Bandura, 1993; Greenwood, Olejnik, & Parkay, 1990; Midgley, Feldlaufer, & Eccles, 1988). Because teacher efficacy has been studied for quite a while, we have reliable measures of teacher efficacy and extensive understanding of its operation and relationship to other variables.

The focus of school reform over the past fifteen years has been shifting from the teacher to the school. Improving teaching and learning at the classroom level are still essential, but reformers have been paying even more attention to the culture and climate of schools, not to mention measurements of achievement at the school level (Rosenholtz, 1988, 1992; Hoy & Woolfolk, 1993; Newmann, Rutter, & Smith, 1989). As the culture of isolation breaks down, teachers feel part of a larger enterprise and researchers seek ways to support and enhance collectivity. Teachers at every level spend the bulk of their time in classrooms alone with students, but they also meet with their colleagues, complete curriculum development and managerial tasks, come to consensus on and work toward common goals, and engage in professional conversations with other faculty members in their schools. Therefore, individual teachers have a stake and a role in helping the school meet its goals—from policy formulation, curriculum design, implementation of pedagogy for specific learning problems, to responsibility for administrative decisions.

Building on what other researchers have done in the areas of efficacy (Gibson & Dembo, 1984; Ashton & Webb, 1986; Bandura, 1993, 1997), organizational health (Hoy & Woolfolk, 1993; Hoy & Sabo, 1997), and communal spirit (Newmann, Rutter, & Smith, 1989; Royal & Rossi, 1999), I wanted to see how these ideas coalesce in the specific realm of high schools. I was particularly interested in how teacher efficacy and collective efficacy related to each other. I also wanted to investigate the relationship of collective efficacy and some aspects of collaborative climate, those closely connected to teachers' activities as part of a professional community in a school.

I determined to contribute to our understanding of the relationships among these concepts at the high school level by conducting a study of grades 9-12 schools in Maine. I focused on three research questions:

- What is the relationship between teacher efficacy and collective efficacy?
- What is the relationship among aspects of collaborative climate relevant to teachers; that is, the quality of their collegiality, the extent of shared goals, and the amount of time spent in collaborative work?
- What is the relationship between collective efficacy and these aspects of collaborative climate?

In the study, I examined the relationships of variables at the teacher level, at the school level, and within each school to more fully understand how they relate and interact.

### **Method**

To begin the study, I selected a sample of 21 high schools (grades 9-12 only) from the 117 in the state of Maine. The sample was designed to represent schools of varying sizes and different levels of economic support. The enrollments in the sample schools ranged from 120 to 1058 students; their faculties, from 14 to 70 teachers.

I surveyed the 792 teachers at these schools during early May 1999. I chose that time so that the respondents could comment on their experiences and feelings about the

entire school year--being close to the end of the year--but still be engaged in tasks and committee-work with colleagues. I had developed a survey instrument over the course of the year before and administered it to faculties in four different schools altering it as reliability analyses and respondents' comments dictated. The study's survey contained 40 items all derived from existing efficacy or climate questionnaires and/or based on specific definitions of the concepts investigated.

The teacher efficacy items were similar to the short version of the Hoy and Woolfolk (1990) teacher efficacy questionnaire. The items concerned how effective teachers felt themselves to be in essential tasks of curriculum development, instruction, and classroom management. It contained the RAND items regarding how effective teachers considered themselves in reaching students generally and how effective they were compared with other factors in their students' lives. I modeled the collective efficacy items on the individual teacher items, changing the "I" to "we." I followed Bandura's definition of collective efficacy "a group's shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given levels of attainment" (1997, p. 477). In creating statements of collective efficacy beliefs, I concentrated on particular tasks and outcomes expected of teachers as part of a school effort.

In developing the collaborative climate items, I used Hoy and Miskel's (1991) definition of school climate, "[It] is the relatively enduring quality of the school environment that is experienced by participants, affects their behavior, and is based on their collective perceptions of behavior in schools" (p. 221). A collaborative ethic infuses the climate with "a set of values or principles that endorse collegial versus independent action as professionals work together to make decisions and solve problems in schools" (Matthews, 1998, p. 163). A collaborative climate is depicted by behaviors, feelings, and beliefs of the teachers in the school. I asked respondents how often and in what configurations they actually met with colleagues. I included items that related to teachers' perceptions of their colleagues and their interpersonal relationships as well as their sense of

unity around learning goals for the students in the school. Most of the items dealt with beliefs or impressions and were measured on a Likert scale of 1, "Strongly Disagree" to 6, "Strongly Agree." The behavioral items were also on a 6-point scale that went from 1, "Never," to 6, "Daily." Appendix A contains the actual items on the survey.

I received responses from 384 teachers and enough (more than 50% of the faculty) from 15 schools to be able to conduct both teacher-level and school-level analyses. I created several variables by clustering the responses to particular items on the survey. Eight items comprised the teacher efficacy variable, and 8 parallel items comprised the collective efficacy variable. The climate composite variable consisted of responses to 24 items and was made up of three variables dealing with aspects of collaborative climate: collegiality (10 items), shared goals (6 items), and collaborative work (8 items). Collegiality described the sense of teamwork or spirit of cooperation on the part of the teachers in a school. I asked teachers about their sense of trust, respect, mutual support, and friendliness toward each other. Having shared goals referred to the extent to which the faculty had a clear, distinct vision and had similar views of how to attain it. Participation in collaborative work related to the amount of time teachers spent interacting and sharing issues of practice with peers in formal and informal ways.

I collated the data from all respondents and conducted correlational analyses of the means of the variables to gauge the association of the variables at the teacher level. After I aggregated the responses by school, I ran similar analyses of the means of the variables at the school level. I also compiled data on the inter-correlations of the variables within each school.

### **Limitations**

The findings of this study and their applicability were affected by survey method, the inherent constraints of instrumentation, and response bias.

Like most surveys, this one suffered from its dependence on respondents' self-reporting. Furthermore, I asked most often about beliefs and attitudes that are more subject to ambiguity than reports of amount of time spent on an activity. Because it is a survey using a Likert scale, respondents had no opportunity for elaboration, explanation, or nuance in their responses. The survey was administered only once, so there was no opportunity to track changes over time.

In constructing the questionnaire, I wanted to make it compact, so I created variables based on combinations of relatively few statements. In spite of careful construction, the variables could be seen as making arbitrary distinctions among complex phenomena. I was not investigating other aspects of climate, e.g., leadership in the school, and it is difficult to say how much other aspects may have been factors in responses regarding the variables in the study. Respondents might have been confused by the vagueness of some of the statements or their lack of variability.

The instrument also presented difficulties because it combined incongruous elements of climate. In most instances, I asked teachers about beliefs and attitudes, but one section of eight statements has to do with the amount of time they spent in different types of meetings or activities. It is legitimate to compare such disparate things, but their differing foci could be problematic to respondents in trying to answer accurately.

Finally, the results are compromised by the reliability of the efficacy variables. I had conducted several pilot studies to ensure the reliability of the variables. I was surprised that the reliability of the efficacy variables in this study was not as strong as it had been in the earlier studies (teacher efficacy,  $\alpha = .60$ ; collective efficacy,  $\alpha = .64$ ; total efficacy,  $\alpha = .72$ ). Other researchers have found similar items more reliable in studies of teacher efficacy. For example, Gibson and Dembo's (1984) 16-item questionnaire yielded these Cronbach's alpha coefficients: .78 (personal teaching efficacy), .75 (general teaching efficacy), and .79 for all 16 items (p. 574).

The study was limited by response bias in several ways: lack of variability in the sample itself, small size of the sample at the school level, and limited number and, perhaps, type of respondents within schools.

Maine is a homogeneous state, so there was not as much variability in the size and per pupil expenditure of schools as in other states or geographic locations. In order to make more definitive comparisons of the relationships among the variables under study, as well as other variables such as size and economic support of a school, I would need a larger and more diverse sample of schools.

To feel more confident in the characterizations of the quality of collective efficacy or collaborative climate in a school, I would have liked a greater rate of response from each school. It is entirely likely that whole departments or other segments of the teacher population at a school were not represented. The results may be skewed because of the likelihood that individuals who did not feel particularly efficacious did not respond to the survey.

Since I did not administer the questionnaire personally, I do not know how much the way the principals described and delivered it to their faculties affected teachers' responses. I assured anonymity of the individuals and the school, and I asked the respondents not to discuss the questionnaire before they completed it, but I do not know how much individual responses were affected by distrust of confidentiality or discussions teachers may have had before completing the survey. Collecting data by having individuals mail their questionnaires to me solved one problem: it increased respondents' trust in the confidentiality of the questionnaires. On the other hand, though, if I had attended a meeting and had teachers respond on the spot, I might have garnered more responses from each school and, I presume, ensured a more representative response. In the data I did analyze, such omissions were a problem especially when exploring the dynamic of variables within schools. Although I based results on schools with a response rate of 50% or more, the

small number of respondents from each school meant I was making generalizations based on a portion of the entire population of teachers at each school.

All of these limitations have an effect on the generalizability of the results. I provide a picture, albeit an incomplete one, of how teacher efficacy relates to collective efficacy and how some climate variables associate with collective efficacy among high school teachers in one small geographic area. The incompleteness of the picture is related to the narrow definition of collaborative climate (in this case concerning teachers' interactions with each other), the homogeneity of the population of schools sampled, and the size of the sample with regard to generalizations about relationships of the variables not only by school but also within schools.

I feel confident in coming to conclusions about the applicability of these results to the general discussion of relationships among efficacy and climate composite variables at the high school teacher level because of the number of respondents in the sample. I am also confident that school-level results are reasonably accurate, but within-school results are limited by the number of schools and the rate of response within the schools. These limitations all reflect the inherent constraints of behavioral research. But I believe reasonable steps were taken here to protect the integrity of the data collection and interpretation, and I am confident the findings add to the continuing research and analysis of collective efficacy with respect to other aspects of the high school environment.

## Findings

In this section, I deal with the results related to the three research questions. Within each area, I discuss the teacher-level then the school-level results.

### The Teacher Efficacy-Collective Efficacy Relationship

The efficacy variables are different, but related, concepts. In this study, I found a moderate correlation between collective efficacy and teacher efficacy ( $r = .44, p < .01, n =$

384) with about one-fifth of the variance shared between the two ( $r^2 = .19$ ). It is logical to think of these as related concepts since they both deal with individuals' assessments of ability to perform certain tasks or attain certain goals. But because teachers in schools operate individually and consider different factors when gauging their own effectiveness as opposed to the effectiveness of the entire school, these concepts are not the same.

Teacher efficacy refers to an individual teacher's sense of his or her own ability to influence students. Collective efficacy, while still derived from individual perceptions, relates to how effective teachers in a school estimate their collective efforts to be in influencing students and producing desired results. It might seem logical to gauge collective efficacy by aggregating the individual teacher's sense of efficacy in a school (Bandura, 1993). But collective efficacy is more than that because, by definition, it takes into account individuals' judgments about how well the faculty as a group performs the tasks of teaching. It is logical to assume that collective efficacy is related to teacher efficacy, however. Like all efficacy measures, these are combinations of an individual's understanding of the tasks, past experience, motivation, and the context in which he or she functions. Analyzing these influences as they relate to either teacher or collective efficacy beliefs shows how different the two perceptions are.

Bandura makes the point that collective efficacy is "a product of the interactive and coordinative dynamics of its members" (1997, p. 477). Just like teacher efficacy, collective efficacy influences the choices individuals make, the amount of effort they exert, and the perseverance with which they engage in tasks. Because of the dynamics of teacher interactions and the variation in the tasks teachers engage in or the goals they strive for as a group as opposed to when they are alone in their classrooms, collective efficacy is an emergent, group-level attribute. It is not just the sum of the teachers' individual efficacy because teachers' estimates of their ability to succeed at a task depend on collective as well as independent efforts.

Bandura asserts that schools function at an intermediate level of interdependence,

the extent to which the group members rely on each other to produce effective results. Bandura describes the reciprocity between teacher efficacy and collective efficacy, "When people work interdependently, their sense of group efficacy rests heavily on the personal efficacy of its members. Personal and group efficacy are likely to be related to some extent and across varied levels of organizational interdependence" (p. 469).

Collective efficacy is not aggregated teacher efficacy; it is another, different kind of school-level phenomenon. In this study, the range of means of teacher efficacy across the schools was narrow (3.90 – 4.44,  $n = 15$ ) compared to those of collective efficacy (3.41 – 5.0). The numbers reflect responses to statements of belief about individual or collective capability to complete particular teaching tasks or reach learning goals. The scale ranged from "1," strongly disagree to "6," strongly agree. Equally important is the range of standard deviations of collective efficacy across the schools (.37 - .99) indicating the variation in cohesiveness around collective efficacy across the schools. The extent to which the faculty in a school hangs together in its belief about the school's effectiveness is an important gauge, too, of its collective efficacy, whereas, this indicator of variation is not so important in reporting the teacher efficacy in a school. This particular finding emphasizes the variation in individuals' assessments of collective capacity and shows, again, how much it differs from teacher efficacy.

Collective efficacy is a school-level phenomenon. I found that at the school level of analysis, there is a stronger association between teacher efficacy and collective efficacy ( $r = .64$ ,  $p < .05$ ,  $n = 15$ ) than at the teacher-level ( $r = .44$ ,  $p < .01$ ,  $n = 384$ ). This correlation indicates that more than 40 percent of the variation between the two variables is shared ( $r^2 = .41$ ). This relationship is an important school-level phenomenon. It gives credence to the notion that changes that increase teacher efficacy in a school would likewise have a positive effect on collective efficacy.

What is surprising about the results, though, is the variation in association of teacher efficacy and collective efficacy across schools. A third of the schools indicated a

moderate relationship of the two efficacy variables, similar to that at the teacher-level, such that about 17 to 24 percent of the variation of the two concepts was shared. Another third had shared variation of about four to ten percent and a few schools had common variation of 40 to 52 percent. I do not think the within-school results belie the notion of the school-level connection between collective efficacy and teacher efficacy. The results emphasize, though, the need to understand school context and the unique quality of each school when reformers are attempting to effect school-wide change to improve student outcomes.

Collective efficacy and teacher efficacy are moderately correlated in high schools.

Bandura's (1993) studies of school collective efficacy focused on the elementary level as did Parker's (1994). Reames and Kochan (1997) studied middle schools, but they were concerned with comparing collective efficacy across types of middle schools. Bandura did not provide an actual correlation coefficient; he depicted a path analysis indicating the interconnection of variables like collective efficacy and SES to student achievement. Parker looked at elementary teachers' estimates of their individual efficacy and their schools' collective efficacy in specific subject areas: mathematics, language, and reading. She found fairly strong correlations between teacher efficacy and collective efficacy (teacher efficacy in reading and collective efficacy in reading,  $r = .73$ ; in language,  $r = .73$ ; in math,  $r = .60$ ,  $p < .001$ ) among elementary teachers. She did not provide correlations of these variables at the school level although she did examine the relationship of collective efficacy to achievement at the school level.

High schools are very different from elementary schools. They are departmentalized; students may be tracked or streamed; curriculum is more differentiated and more challenging at this level. Cusick (1980) describes high school teachers as entrepreneurs protecting their own classrooms and advancing their careers irrespective of others. For a variety of reasons, we might expect to see a different relationship of these two efficacy measures at the high school level. And, at the high school level, because of the disciplinary focus of the individual teachers, it makes sense to gauge efficacy in general

terms rather than related to specific skill or subject areas. So it is not surprising that I found only a moderate correlation of teacher efficacy and collective efficacy at the high school level.

This finding seems to corroborate Bandura's theory about the interdependence of schools and collective efficacy and, for that reason, strengthens the argument for more exploration of and emphasis on collective efficacy as relevant to school reform efforts. School and individual context, as we know, have an effect on teacher efficacy (Gibson & Dembo, 1984; Ashton and Webb, 1986; Woolfolk & Hoy, 1990), and we might assume that different aspects of the context affect collective efficacy. Researchers have started to study some of the ways such things impact collective efficacy. Bandura's study indicated that collective efficacy could predict student achievement as well as teacher efficacy does. Reames and Kochan (1997) found that an older staff often has lower collective efficacy even if it is quite effective in producing results. Furthermore, they found collective efficacy was affected by the socio-economic status of the students in a school. Baker (1997) found a strong correlation between individual efficacy and collective efficacy when groups formed, but they became less and less associated as groups congealed.

My research supports the notion that collective efficacy and teacher efficacy are different, but related, constructs. The school context affects both teacher efficacy and collective efficacy but may affect them differently. Certain realities of schools, though varying from school to school (e.g., teacher isolation and autonomy), help explain some of the influences on collective efficacy and how and why it may fluctuate within a school from teacher to teacher. As schools become more collaborative, the barriers to teacher isolation are mitigated, and citizens pay more attention to accountability measures of a whole school's performance, schools, particularly high schools, may become more interdependent. Results of my study shed some light on these possibilities.

## Interrelationships of Aspects of Collaborative Climate in High Schools

Many schools have embraced collaboration and collaborative leadership even as they are working out what these concepts actually mean in specific situations. Collaboration and collaborative leadership deepen the notion of participatory management and democratic decision-making by creating a structure and culture for teachers to work together on the essential responsibilities of the school, teaching and learning (Smith & Scott, 1990). In trying to gauge the extent to which high schools have collaborative climates, I considered norms of collegiality; shared understanding of the means and ends of the school's work; and opportunities, both formal and informal, for the staff to analyze, strategize, evaluate, decide on, and improve their teaching practice. In Maine high schools, I found the teachers, on average, to feel fairly collegial and to display some sense of shared goals or purposes. They tend to meet together monthly, formally or informally, for such things as curriculum development, policy-making, discussion of student management issues, or professional development activities.

Aspects of collaborative climate are inter-related at the teacher-level. The results provide evidence that the climate variables of collegiality, perception of shared goals, and time spent in collaborative work represent different concepts even if they are related to each other. Among the high school teachers, I found a solid association between collegial feelings and sense of shared purpose ( $r = .73, p < .05, r^2 = .53, n = 384$ ). But both of these aspects of collaborative climate were less associated with the amount of time teachers spent meeting together (collegiality:  $r = .44, p < .01, r^2 = .19$ ; shared goals:  $r = .42, p < .01, r^2 = .18$ ). The data indicate that some of the shared variation between collegiality and shared goals could be accounted for by participation in collaborative work, but there are other factors involved in the relationship also. We do not know if one, in fact, fosters the other; but it is useful to think about how to enhance both and to measure the extent to which

teachers' spending more time together might affect collegial relationships and perceptions of shared goals.

Collaborative climate is a school-level phenomenon. Just as we think of collective efficacy as a school-level phenomenon, it is relevant to think of collaborative climate at the school level. The school-level statistics indicate that teachers' collegial relations and perceptions of shared goals average about the same as at the teacher-level, indicating moderately strong feelings of trust and mutual support as well as sense of shared goals at the school level. The average amount of time teachers spent in collaborative work was similar also, about once a month.

Aggregating the data by school and comparing the correlations of the climate variables reveal different relationships from those at the teacher-level showing that, like the efficacy variables, the climate characteristics interact differently when you analyze them at the level of the school. Teachers in the same school more often had a common view of these variables than did individual teachers in general. At the school level, the relationship between shared goals and amount of participation in collaborative work remains the same as the teacher level ( $r = .41, p > .05$ ), but the connection between collegiality and shared goals is even more solid ( $r = .85, p < .01$  versus  $r = .73, p < .05$ ). The major difference is in the much stronger connection between collegiality and participation in collaborative work ( $r = .76, p < .01$  as opposed to  $r = .42, p < .01$ ).

High school teachers do not spend much time on collaborative work. Teacher collaboration on curriculum development and issues of practice is a major tenet of many reform efforts. The results regarding school-level associations between collegiality and amount of time teachers spend working together offer some support to the idea, but the results show that teachers in high schools do not work together very often. They gather monthly for meetings with a range of frequency of such meetings as quarterly to bimonthly.

In completing the part of the questionnaire concerned with amount of time in

collaborative work, teachers responded to items about the frequency of four types of formal, structured meetings and four informal and casual opportunities to discuss individual students or effective teaching strategies. I found many more frequent interactions of the informal variety. Invariably, the highest means were for items 1.1 and 1.3: "We talk informally with each other to reflect on and improve what we do" and "We help each other figure out how to handle difficult students." The mean frequency of informal meetings at the teacher level was about 2-3 times per month for each of these items. In some schools, the average frequency of these items was as high as "very often," i.e., weekly or bi-weekly.

When I compared the relationships among formal work and informal work and the other collaborative climate variables, I did not see much difference from the total shared work variable at the teacher or school level. But within the schools, I found a considerable range of correlations between both formal and informal work configurations and collegiality and shared goals, but there not enough clear differences to make secure claims about the pattern of relationships.

My study focuses on teachers and does not analyze such things as principal behavior or student management. Like the efficacy concepts, though, quality of collegial relations, consensus on goals, and amount of time teachers spend working together are strong, separate indicators of the way individual schools are functioning at least with regard to the beliefs and actions of teachers.

More work needs to be done exploring these relationships at the school level, but this study adds support to the notion of the interrelationship of key aspects of collaborative climate. For example, my study found that teachers in high schools do not spend much time working together on issues of practice. But as high schools restructure time to allow for team work, critical friends conversations, mentoring relationships, and teacher-directed curriculum development, researchers might see stronger connections between collaborative work and other aspects of collaborative climate.

## The Relationship Of Collective Efficacy and Collaborative Climate

It is logical to think there is a connection between collective efficacy and collaborative climate. In other words, there should be a relationship between how well teachers believe they, as a faculty, can put into effect the necessary steps to achieve performance standards for the students in the school and how trusting and mutually supported they feel, how much they agree on the same goals, and the extent to which they spend time working on issues relevant to teaching tasks. This study supports that reasoning.

Collective efficacy is moderately correlated with collaborative climate at the teacher level. Among high school teachers in Maine, I found a moderate relationship between collective efficacy and collaborative climate ( $r = .38, p < .01, r^2 = .14, n = 384$ ). Close to 15 percent of the variation between these two variables is shared. This relationship reflects, I think, the fragmentation of high school faculties in spite of efforts to enhance the collaborative climate for teachers in schools. High school teachers still function in isolation, to a large extent, and do not consider themselves to be responsible for learning outcomes across the school.

Because of the similarity of the collective efficacy-collaborative climate relationship to the .44 correlation between teacher efficacy and collective efficacy, I would have predicted a similar correlation between teacher efficacy and the climate composite. However, the correlation between teacher efficacy and the climate composite variable was minimal and insignificant. The data provide further evidence that teacher efficacy is a different construct from collective efficacy because it functions differently in relationship to collaborative climate. There are influences on collective efficacy that do not affect teacher efficacy.

School-level relationships between collective efficacy and climate are strong. My findings support the idea that the various climate variables represent separate qualities of the school's climate because they each interact differently with collective efficacy. Breaking

down the collective efficacy-climate relationship, I found similarly moderate connections between collective efficacy and both collegiality ( $r = .33, p < .01$ ) and shared goals ( $r = .36, p < .01$ ) but a less solid connection between collective efficacy and amount of time spent in collaborative work ( $r = .23, p < .01$ ).

The results reinforce the notion that these variables represent important school-level phenomena that may be worth attending to as high schools implement reform efforts that seek to improve both collaborative climate and collective efficacy. With the school as the unit of analysis, I was not surprised to find stronger connections between collective efficacy and the climate composite ( $r = .50, r^2 = .25$  versus  $r = .38, r^2 = .14$ ). In addition, collective efficacy was solidly associated with both collegiality ( $r = .56, p < .05, r^2 = .31$ ) and shared goals ( $r = .73, p < .01, r^2 = .53$ ) but less connected with the amount of time teachers spent in collaborative work ( $r = .26$ ) at the school level. Just as in the stronger correlations of the two efficacy variables and among the climate variables themselves at the school level, these solid correlations indicate how much teachers in schools have a common perception of these variables than do the teachers as individuals. The results also emphasize how useful it is to consider ways of enhancing collective efficacy by strengthening the collaborative climate at the school level.

The efficacy-climate relationships vary within schools. The relationships among the efficacy variables and the collaborative climate variables present a dazzling array of combinations within the schools; however, most schools showed no correlation between teacher efficacy and collaborative climate. There was a clear tendency for schools' collective efficacy means to parallel teachers' perceptions of climate, but there was a fairly even split between the schools that had weak correlations between collective efficacy and collaborative climate and those that had stronger ones, that is, having shared variation between the two of about one-fifth to one-half. At a few schools, there were strong associations between collective efficacy and amount of collaborative work, but generally the correlations between collective efficacy and the separate climate variables were small to

moderate. I also found that collective efficacy was not strongly connected with either formal, structured kinds of teacher work or informal, task-oriented meetings of teachers.

Teacher efficacy is not correlated with the collaborative climate variables. The lack of a relationship between teacher efficacy and the climate variables, in spite of a strong correlation between collective efficacy and teacher efficacy at the school level, is puzzling. It stands to reason, though, that aspects of school climate having to do with collaboration among teachers would have a greater impact on individuals' feelings about collectivity than on their individual teaching. Other aspects of climate, like order or principal leadership, might affect teacher efficacy more than they affect collective efficacy.

Bandura (1997), in his theorizing about collective efficacy, hypothesized greater differences between groups than within groups with regard to measures of collective efficacy. On the other hand, he acknowledged that collective efficacy "is not a static group attribute.... [It] rises and falls with fluctuations in inter-linking relationships among members and changing external realities and pressures" (p. 470). Newmann, Rutter and Smith (1989) tried to look at between-school differences on a variety of organizational factors, but they found greater differences within schools than between them. Royal and Rossi (1999) said that their study corroborated the findings of others regarding variations within and between schools: "Our findings support the notion that climate is not constant throughout schools, moreover, that differences in teachers' perceptions of school organization and climate may have important implications for their sense of community" (p. 265).

My study confirms their view. I found a general lack of cohesiveness among the individual teachers' attitudes in a particular school with regard to the variables in this study. And the variations give rise to many questions about how and why teachers in a school view things differently. Such questions include: How do tenure, experience, subject matter, size of department and size of school affect the efficacy and climate variables? And, from a school leader's perspective, they also encompass such questions as: How have

school reforms efforts at this school affected the teachers' sense of individual and collective efficacy? Has our increased sense of collective efficacy made a difference in the effectiveness of our teaching and student's learning? Is it enough to have a sense of shared goals and small pockets of collegial and even collaborative team work or do we need to have more structured, "legitimate" time set aside for collaborative work?

These complicated questions illustrate the multiple and varied ways school leaders can approach the issue of what to emphasize in trying to help a school embrace collaborative structures and feel capable of meeting teaching and learning goals for themselves and their students.

### **Implications**

The many questions surfaced by the results show how useful it is to do more work in this area. In the first part of the implications section, I discuss how researchers might build on the findings here to deepen our understanding of collective efficacy. In the last part of this section, I elaborate on how practitioners can make use of the findings of this study to inform their efforts toward school change.

#### **Implications for Research on Efficacy and Climate**

Self-efficacy has many ramifications for action and beliefs: It influences decision-making, learning, risk-taking, persistence, and social interaction. The same could be said for teacher efficacy and collective efficacy. At the collective level, though, these factors have a different implication and more complicated dynamic. The results of my study surface the same questions I researched, but my study provides some grounding for deeper explorations of collective efficacy.

What is collective efficacy and how can we measure it? Both Bandura (1993) and Parker (1994) measured collective efficacy by asking teachers about their collective ability to help students make achievement gains in particular curricular areas. I used Bandura's

definition of collective efficacy but measured it differently. I considered the tasks of teachers—especially as part of a faculty—and asked the respondents to rate how well they thought their school accomplished them. For example, one item in this study asks teachers to assess how well they as group could implement a new curriculum.

This approach enlarges the concept of collective efficacy. It involves not just how well teachers think they can meet targets in a specific learning area, but also how skillful they think they are as a group and how well they can organize themselves and jointly implement curriculum to help them achieve learning outcomes. In addition, this enlargement of the construct makes a close connection to the salient aspects of teacher efficacy by asking teachers to gauge how effective they judge themselves to be in dealing with all students, even difficult and unmotivated ones, and to assess their influence on students compared to other factors in their students' lives.

My study provides more groundwork for the ongoing exploration of collective efficacy and its relationship to other constructs. It would be useful to see if the items I used work as well with teachers other than those at the high school level. Further analyses of teaching tasks, especially in conjunction with collective responsibility, could tighten the concept even more. Tweaking the instrument I created or developing one that combines Bandura's method and the one I used would help to strengthen our understanding of collective efficacy and could teach us more about how to measure it.

What is the relationship between collective efficacy and teacher efficacy? I have to admit my reliability coefficients for both teacher efficacy and collective efficacy are not as high as those of some other researchers, but I think this study provides a direction for further study of collective efficacy and its relationship to teacher efficacy along the lines described earlier. In fact, in following Bandura's definition in all its aspects and aligning it more closely with measures of teacher efficacy, I have provided a way to look at both of these concepts more fully. The research literature reveals relationships between teacher efficacy and such variables as teacher longevity and willingness to avail oneself of

professional development opportunities. Because my study shows a moderate correlation between collective efficacy and teacher efficacy, we might assume a similar relationship of these variables to collective efficacy. Just as I discovered that aspects of collaborative climate, although correlated with collective efficacy, were not correlated with teacher efficacy, more research would serve to elucidate potential relationships and uncover other aspects of the teacher efficacy-collective efficacy relationship.

Most studies of teacher efficacy have been at the elementary level; more need to be conducted at the high school level to understand the contextual influences on both teacher efficacy and collective efficacy. I have found considerable variation in teachers' assessments of teacher efficacy and collective efficacy across schools, so it would be worthwhile to examine such things as department affiliation, size of school, or grade level to see how those factors affect efficacy variables.

It would be helpful to examine schools and reform efforts that have managed to enhance both teacher efficacy and collective efficacy and, too, to study those situations where teacher efficacy may have decreased but collective efficacy increased. It will be useful to explore how faculties in a school manage the tension of teacher efficacy and collective efficacy. For example, at one school, after some breaking down of isolation through collaborative staff development activities, teachers may feel vulnerable when they hear about what others may or may not be accomplishing. As a result, they might withdraw from efforts to collaborate and only reluctantly make decisions about the direction and instructional practices of the school. The staff might abandon collaborative efforts led by teacher leaders leaving the faculty discouraged or the teacher leaders themselves defeated by the discrepancies they see in practice or the lack of progress in student achievement. On the other hand, a faculty might move along the teacher leadership-empowerment-collaborative culture continuum without losing the sense of personal teaching efficacy often buoyed by more isolated and autonomous structures. As a school, they would fight the "it's not worth it" attitude in whatever ways they could in order to reap the benefits of collective

approaches as evidenced by student learning. Citing the tension points as well as testing effective strategies for amelioration in these scenarios would be most useful for school reformers and leaders as they strive to improve schools.

How does collective efficacy relate to collaborative climate? This study was based on the literature of school reform that asserted the relationship of collaborative climate, teacher efficacy, and organizational commitment (Ashton & Webb, 1986; Rosenholtz, 1989; Louis, 1992; Reames & Kochan, 1998). Bandura (1997) alludes to collective efficacy's close relationship to effective schools strategies. These and other studies indicated that actions, beliefs, and attitudes of teachers are important in effective schools (Fullan, 1987; Newmann, Rutter, & Smith, 1988; Louis, 1989; Corcoran, 1990; Little, 1992). My study supports that notion and provides some bases for measuring the extent to which beliefs and attitudes of teachers impact student learning.

The effective schools research suggests that school climate has reciprocal causation with collective efficacy in enhancing student achievement (Bandura, 1997; Hoy and Sabo, 1997). The results of my study support the relationship of collaborative climate and collective efficacy. Even if we believe that enhancing collective efficacy is a goal in its own right, it is vital to see its connection to student achievement, especially at the high school level. As high schools, particularly those in Maine instigated by focused reforms called for by the Maine Commission on Secondary Education, move from a culture of isolation and autonomy to one that is more team-oriented and collaborative, we might see a stronger connection among these variables. More research will be necessary to gauge the changes in high schools to see if the relationship of collective efficacy with student achievement holds up at the high school level. As noted earlier, more exploration of the complex dynamic of teacher efficacy and collective efficacy as well as collaborative climate in reforming schools will be valuable in planning how best to proceed to get the greatest effect from school improvement efforts. Such research can add to our knowledge of how these factors combine or intervene with each other as well as provide school practitioners with useful

information about what is happening at their own schools as they implement strategies for improvement.

The results of my study help us begin to see the big picture of how these factors operate at the school level. The strength of the associations offers tantalizing prospects for school reform but suggests many questions too. Some of the questions have to do with how these factors interact: Does collective efficacy arise from the collaborative climate or does it, in fact, precede the development of shared goals and collegial feelings? Is there a circuit-breaker in the teacher efficacy-collective efficacy relationship such that the increase of the latter does serious damage to the former? These questions segue into questions about the relationship between specific collaborative climate variables and the efficacy variables.

How do the collaborative climate variables interact and then relate to collective efficacy and teacher efficacy? Other researchers have found faculty collaboration and critical collegiality to be correlated with teacher efficacy (Ashton and Webb, 1986; Rosenholtz, 1989; Louis, 1992). My study belies that association. One explanation is simply that the high school teachers in this study do not spend much time together. Another explanation is offered by Smylie (1990) who warns that the literature is equivocal regarding measurement of efficacy and methods for enhancing it. Specifically, he says it is unclear whether teacher efficacy is fostered by essential information about best practices or critique of one's own practice based on effective teaching research. Soodak and Podell (1996) echo this ambiguity. The lack of a relationship between teacher efficacy and the collaborative climate variables in this study not only indicates that teacher efficacy and collective efficacy are not always affected by the same things, but also that our notions of collaboration and collegiality are in flux. They may function quite differently at different levels and types of schools. Further studies exploring the connection between collaborative work, as well as the specific tasks and purposes of such work, and collective efficacy are needed.

Just as Hoy, Tarter, and Kottkamp (1991) discovered that faculty trust is unrelated to principal leadership, researchers might find that principal leadership is associated

strongly with teacher efficacy but less so with collective efficacy, if, as these authors noted, it is interrelationships among teachers rather than behavior of principals that promote interdependence, combined responsibility, and trust.

Other avenues of research that this study surfaced have to do with teacher behavior related to collaborative work. Judith Warren Little (1990, 1991) says there is little shared planning and preparation of materials and curriculum at the high school level. Furthermore, she says schools and teachers continually vacillate on the independence-interdependence continuum. She refers to Lortie's work (1975) and a similar study done in the 1970s by Pellegrin both of which emphasize the independence and isolation of teachers. Little claims that both interdependence, the perceived need of others for their own success, and opportunity to work together are crucial for true collegial support and collaboration in schools. One without the other does not yield the collaborative climate desired. My study shows that high school teachers do not spend much time working collaboratively, and it also supports the notion that collegiality is connected to time spent working together. Collective efficacy, though, does not seem to be tied to collaborative work, but that may be an indication of the lack of a sense of interdependence among teachers at the high schools in this study.

More work in this area would enlarge our understanding of the complexity of high schools as collaborative workplaces. It would be worthwhile to investigate what happens when teachers have structured time to spend on specific tasks as well as policy decisions and what amount of time spent in collaborative work makes a difference in both collaborative climate and perceived collective efficacy. In addition, there are many issues related to school context and organizational structure. It would be valuable to examine the extent to which departmental affiliations, team configurations, and teacher leadership roles affect both efficacy and climate.

Organizational climate can be consciously changed and developed (Hoy & Sabo, 1997), so it is worthwhile to focus on these factors that have the potential to affect

conditions of work for teachers, their attitudes about their collective capacity, and the learning of their students. Studies looking at the relationship of these variables to student outcomes, research conducted over a period of time, as well as qualitative studies would tease out some of the intervening factors in the anomalous patterns as well as provide insight into the normative patterns. Is the ideal school one where all three variables are correlated highly? Or is it more likely, and more effective, for a school to have moderate correlations of teacher efficacy with collective efficacy and higher correlations of collective efficacy with collaborative climate? Examining and documenting school change efforts as they relate to organizational structure, emphasis on collaboration, and enhanced roles for teacher leaders is a valuable kind of action research that combines the theoretical and the practical. Both qualitative and quantitative researchers would find this study a base for useful work.

### **Implications for School Leaders and School Improvement Efforts**

I can see many avenues for more research, but I can also identify some findings that could be useful for school leaders as they create environments for improved teaching and learning.

Recognize the potential of collective efficacy. Even if we are not quite sure exactly what collective efficacy is nor how to measure it, the concept itself can be a powerful motivator for leaders trying to affect school-wide reform. Bandura's definition coupled with the items I created offer some guidelines to administrators and teachers who want to raise teachers' consciousness about their collective responsibility as they also emphasize and estimate their capacity for collective action. Understanding the concepts of teacher efficacy and collective efficacy as well as their relationship to each other could provide an important path toward school change for leaders hoping to make a difference in their schools. Leaders need to nurture individual teachers and support their continued growth while embarking on school change efforts that make teachers aware of their collaborative

capacity and responsibility for producing results for all children in the school. It is another version of the paradox of organizational change: for schools to improve their leaders need to attend to both the individual and the collective in strategizing to maximize effectiveness. My study indicates that leaders can affect individual teacher efficacy by working on aspects that affect collectivity.

High schools magnify the impact of this paradox. The school-level results of this study indicate a strong connection between collective efficacy and teacher efficacy. We could assume that activities that what would enhance teacher efficacy would have a similar effect on collective efficacy. So even though high schools are fragmented because of disciplinary and departmental affiliations, cross-disciplinary professional development work on effective teaching practices addresses teacher efficacy, and probably collective efficacy, and also would help to ameliorate some of the fragmentation. Critical Friends Groups promote such interdisciplinary conversations about issues of practice especially as they relate to student achievement.

At the heart of good teaching is intense individual activity. Such intensity both requires and fosters the isolation of the job (Lortie, 1975). But teachers need to be able to step away from the moment and look at where their own work is headed and see how much they depend on the good work, careful planning and implementation, and thoughtful evaluation of their colleagues. Since the social and collegial contact is crucial to this expansion, school leaders need to make the collective life positive, productive, and supportive.

I would argue that collective efficacy results from what Peter Senge (1990) refers to as "alignment." In team-work terms, it occurs when "a commonality of direction emerges, and individuals' energies harmonize.... A resonance or synergy develops" (p. 234). In fact, he argues that alignment must come before "empowering the individual will empower the whole team" (p. 235). When there is no alignment and the individuals are empowered, there is chaos, or at least squandered opportunity. This has so often been the case in high

schools. Being a maverick was the only way to go. No sense of purpose, no sense of the collective reined teachers in and harnessed their energy toward a common goal. But when teachers are in sync, when they have a direction and vision and feel others are working well with them, they are energized by the work and feel part of a collective that can fulfill its goals. Senge's vision of alignment shows how economical and powerful it is to recognize and commit to one's role as part of a collective.

All teachers matter, but the leadership of certain teachers is critical. My research suggests that teacher leaders must have an orientation toward the collective and the energy to pull in the super-teacher and the loner. They take it upon themselves to share what they do and to teach other teachers. They look for opportunities for teachers (entire faculties or small groups) to clarify their intentions and publicly critique means and ends. These teachers find sustenance and support in their work with like-minded colleagues who grow in number as a collective mind-set emerges.

Create a collaborative climate. It is useful to deliberate a bit on what the collaborative climate construct consisted of in this study. I was looking specifically at when and to what extent teachers actually spent time together on tasks related to policy-making, developing and implementing curriculum, and problem-solving for individual students or groups of students. The collegiality construct involved socio-emotional connectedness, i.e., the extent to which faculty members experienced trust, support, respect, encouragement, tolerance of differences, dependence and teamwork among themselves. Shared goals, a philosophical construct, encompassed how much teachers felt they had a common understanding of the needs of the students in the school and how similar were the learning outcomes, including skills and attitudes, for all the students. It also involved the extent to which they shared views of how to attain the school's goals as well as educational philosophy in general.

Educational leaders should note the inter-relationships of these variables as they strategize to promote a collaborative climate in their schools. There is a clear relationship

between collegiality and shared goals and between collegiality and time spent working together on tasks relevant to their teaching. My data analyses did not involve determining causation, but knowing there is a dynamic among these three climate variables would be helpful in developing school improvement plans if creating a collaborative work environment for teachers is one of the objectives of such a plan. Even though high school teachers do not spend much collaborative time together, they do spend much more time working together informally than formally which lends credence to the relationship of collegiality and time on shared work.

The study clearly shows that sense of trust, respect, and dependence are related to shared goals. And the time spent working together is related to this mutual regard and teamwork. So attending to these would affect the climate of the school. Creating time for teachers to work together may be more easily done in high schools than elementary schools. It requires not just blocks of time when teachers are free, however. School leaders need to create an atmosphere where teachers see their work as connected to others' and set expectations for results at the school level. Heightened consciousness is one thing; responsibility is another. They both set parameters that a collaborative climate can address. By de-constructing and understanding what the concepts mean, leaders have a direction for their work on climate at least as far as teachers are concerned.

Capitalize on the relationship between collective efficacy and teacher efficacy. One major piece of information this study provides for practitioners is that teacher efficacy and collective efficacy are two separate concepts. They are related to each other, so what influences one might have some effect on the other. Other researchers have shown how professional development can improve teacher efficacy, so we might deduce that buoying teacher efficacy would have some effect on collective efficacy.

Even though aspects of collaborative climate studied here are not related to teacher efficacy, there are other aspects of school context that might affect both. In making use of the data on the teacher efficacy-collective efficacy relationship, school leaders should keep

in mind the reciprocity of these two efficacy concepts even as they recognize their different aspects, antecedents, and inducements. Working on collaborative climate should have an effect on collective efficacy and then indirectly on teacher efficacy. But we cannot forget the individual teacher in the emphasis on the collective. As Bandura (1977) points out, "The challenge ahead is the development of social practices which promote the common good in ways that still preserve the greatest possible individual freedom" (p. 212).

Still, it may be important at some point for a school to risk individual teacher efficacy by heightening collective efficacy. The autonomy and heroic effort of the individual teacher may need to be undercut in order to realize the greater goal of whole school improvement. This study has found that a teacher may not feel particularly effective, from inexperience, say, or evidence of lack of performance of students, but she or he can feel part of a larger enterprise that the individual considers effective.

Build collective efficacy through shared goals and collegiality. A major thrust of this study was to test the logic of a relationship between collective efficacy and collaborative climate. School-level results support the notion and point toward specific implications for school leaders. The teacher efficacy-collective efficacy relationship is important, and another meaningful finding here is that some school-level characteristics, especially collegiality and shared goals, are associated with collective efficacy and not teacher efficacy. The evidence on collective efficacy provides school leaders with a way of thinking about how the beliefs and attitudes of teachers regarding the school's ability to perform and meet challenges can be mediated and influenced. Bandura (1993) and Parker (1994) found clear connections between collective efficacy and student achievement in the schools in their studies, so there are potential benefits from strengthening collective efficacy and its correlates.

The strong correlations between collective efficacy and shared goals suggest leaders should explore goal-setting strategies that could enhance collective efficacy and thus student achievement. One could argue that high school teachers have always had shared goals for

their students. Graduation requirements specified exactly how many courses and in what subject areas students needed to pass in order to fulfill the goals of the school. Carnegie units are still used, but schools all over the country have much more clearly stated guiding principles and outcomes for their students. In Maine, the Learning Results developed over a long period of time with input from many teachers along with other stakeholders, provide definite expectations for what knowledge, skills, and attitudes students should be learning throughout their k-12 education. The fact that teachers share goals explicitly with each other permits and encourages them to get together and establish not only how and when they will implement plans to meet the learning goals but also how they will assess how well their students are fulfilling the goals. Simply knowing that colleagues are pulling for the same outcomes can increase an individual's level of confidence and encourage teachers to build confidence in others. Just as the entire educational community is increasingly aware of the importance of embedding meaningful assessments in the curriculum, teachers are collectively organizing and putting into practice new approaches, as well as time-honored methods, for helping students reach learning goals.

In other words, having goals—whether they are seen as imposed or not—is conducive to collective efficacy. And even if, in actuality, the goals vary from person to person or school to school, there are targets toward which an entire school is working and for which all the faculty members are responsible. Less strongly associated with collective efficacy—though quite definitely connected to shared goals—is collegiality. It stands to reason that the power of shared goals could be enhanced by socio-emotional connectedness. Enhancing collegial relationships so that teachers know how to encourage each other to take risks, to support each other as they work singly or inter-dependently, and to confront and also tolerate their differences would be useful ways to approach tasks connected to implementing learning results.

The teacher leader role is important to fostering a collegial and, ideally, collaborative environment. In fact, teacher leaders are much better positioned to shape collegiality than

are principals. Principals can help create structures that promote collegiality and collaboration, but teachers themselves are the key actors in bringing the ideas and ideals to fruition. It is the between-the-cracks and behind-the-scenes work of teachers as leaders that builds on collegial relations to make them truly collaborative around shared goals and curricular change. Awareness of the concept of collective efficacy—and of its importance—can galvanize teacher leaders. Improving their own and others' practice, assisting each other in developing plans to bring statewide goals to fruition, and making decisions about curriculum and policies that affect the learning of all students are important ways teacher leaders can promote collectivity and thus collective efficacy.

None of this requires, of necessity, that an entire school faculty gather together and come to consensus on plans and purposes, although that kind of activity is part of the aligning process. Often the bulk of the activity that promotes collective efficacy happens in small teacher groups, either formally structured or informally convened for a particular purpose or problem. These "teams" assist, support, and encourage individuals to be better practitioners for the good of the whole. While there is no apparent direct link between collective efficacy and the amount of time teachers spend meeting and working together, the amount of time working collaboratively is associated with both shared goals and collegiality which are important correlates of collective efficacy.

There is a logic in that. The interaction between collegiality and the development of shared goals occurs in a variety of activities. The normal venues of collaboration are faculty meetings, grade-level or subject-area curriculum development meetings, critical friends groups working on understanding and improving practice, ad hoc policy or decision-making committees, and the informal encounters teachers have with each other when they feel confident in and trusting of their colleagues as well as share responsibility with them. A sense of true collaboration arises from collegiality and is nurtured and sustained by ongoing development, implementation, assessment and re-configuration of shared goals. From all this work, not apart from but integrated with their work with the students in their

classrooms, comes a sense of their collectivity and a belief in their collective capacity to accomplish the goals.

Understand a school's context in order to promote collective efficacy. The school-level results of this study show that teachers in the same school more often had a common view of the variables than did individual teachers generally. Granted, the aggregated-by-school results are more stable and would reflect stronger relationships, but the power of the connections and the variability within schools dovetail with the notion that the school is the unit of change in reform. For some time, practitioners, researchers, and policy-makers have been focusing on such things as creating professional communities and building organizational capacity in schools (Fullan, 1990; Darling-Hammond, 1990; Royal & Rossi, 1999). Ann Lieberman highlights the importance of school-based reform.

...[C]omprehensive change in the school as a whole requires focusing on issues of restructuring and transformation of *the school*, rather than on specific projects or innovations....[I]ndividuals' understanding that changing schools demands changing practices, and that structures must be built to support these changed practices, leads them toward cultures of collegueship, continuous inquiry, and collaborative work that may well mark the organizational path to the schools of the future. (Lieberman, 1995, p. 15)

Secondary schools are complicated sites for school reform, but it is in high schools where fundamental kinds of changes are needed and have great potential for changing practice (Fullan, 1990). High schools are diverse, complicated, multidimensional communities within communities (Sergiovanni, 1994), but "[t]o design settings that will promote excellence for high school teachers and their students, educators require sophisticated understanding of the multiple embedded contexts that define the secondary school workplace and shape teaching and learning within them" (McLaughlin & Talbert, 1990).

The results of the within-school data in this study illustrate the complexity of school context in trying to plan specific interventions to promote efficacy. It would be useful,

though, for school leaders to use information about the school, such as that found in this study, to help the teachers understand how they are functioning and what the ramifications are for their collective efficacy. For example, distributing scatter plots of the relationships among collective efficacy, collaborative climate variables, and teacher efficacy at a particular school would offer a potent visual representation of what the school looks like. Seeing "pictures" of themselves would promote rich conversations among the faculty about how they function and what they believe about themselves. Such discussions could lead to specific actions that would improve collaborative climate and strengthen collective efficacy.

The aspects of collaborative climate highlighted in this study are enhanced by the kind of school leadership Donaldson (1999) describes. He says schools demand a particular kind of interactive leadership that encourages school community members to believe in "action-in-common." Teacher leaders especially can lead in these ways, but teachers and teacher leaders cannot do it alone. In fact, it is the top-down and ground-up interaction of leadership that makes for effective schools. Evans (1998) calls it "binary leadership." Strong principal leadership and strong teacher leadership are not in opposition; they work in tandem to ensure "that the faculty are focused on the same goals, take collective responsibility for achieving these, and coordinate their instructional efforts" (p. 243). This authentic participatory leadership implies that teachers can be both effective teachers and strong leaders as they work together with other members of the school community to ensure learning and growth of their students and those in the entire school.

Peter Senge (1990) provides constructive ways for thinking about what this means in a school organization. Senge says that organizations need to be learning organizations with leaders as teachers. He does not call for a visionary or charismatic leader who teaches others what to do; rather he describes how leaders throughout the organization nurture learning for everyone so that all participants understand how the system functions and how to use their power and influence in it. This view of leadership can be realized if we acknowledge the existing structures but embrace new images and processes that synthesize

organizations and relationships among people in an organic, holistic process. Nurturing people and sustaining relationships are crucial to making this kind of school leadership possible and workable.

My study shows that fostering the interaction of several variables is a useful way to think about making changes that have the potential to increase effectiveness. For too long, high schools have been unfortunate bastions of the status quo. Capitalizing on interactive leadership to develop collegial relationships and collaborative environments centered on shared goals has the potential to affect teachers' beliefs in their school's effectiveness and improve learning. Bandura (1997) describes it this way.

People's beliefs in their collective efficacy influence the type of future they seek to achieve, how they manage their resources, the plans and strategies they construct, how much effort they put into their group endeavor, their staying power when their group efforts fail to produce quick results or encounter forcible opposition, and their vulnerability to discouragement. These processes, which shared efficacy beliefs activate, affect how much they accomplish collectively. (p. 478)

This study adds another layer to the discussion of how schools work and how they might work better. As we get smarter about what it takes to help teachers and schools improve what they do and how they do it, we find new ways to describe what we see happening. Collective efficacy offers more than a catch-phrase to the school improvement lexicon. The evidence here suggests that it is an attribute of central importance. When teachers believe that their school works well, they have greater capacity to meet teaching and learning goals. Leaders in schools—both principals and teachers—can draw confidence from this study that their efforts to connect teachers to a common mission in a collegial compact are vital investments.

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## APPENDICES

### Appendix A: Teacher Survey

Please supply the following information regarding your teaching experience and position in this school.

Years experience in teaching (number of years) \_\_\_\_\_

Years teaching at this school (number of years) \_\_\_\_\_

Primary teaching responsibility: \_\_\_\_\_

Full-time teacher \_\_\_\_\_ (yes or no)

If yes, please indicate subject area: \_\_\_\_\_

If you are not a full-time teacher, please briefly describe your position:

#### Part I Directions.

Please circle the word that most accurately reflects what happens in your school.

Note: "We" refers to you and the teachers at your school.

1. We talk informally with each other to reflect on and improve what we do:

Never   Occasionally   Monthly   Often   Very Often   Daily  
(No more than 4 times/year)   (2- 3 times/month)   (Weekly or biweekly)

2. We help each other develop curriculum:

Never   Occasionally   Monthly   Often   Very Often   Daily  
(No more than 4 times/year)   (2- 3 times/month)   (Weekly or biweekly)

3. We help each other figure out how to handle difficult students:

Never   Occasionally   Monthly   Often   Very Often   Daily  
(No more than 4 times/year)   (2- 3 times/month)   (Weekly or biweekly)

4. We have structured time for talking about classroom practices:

Never   Occasionally   Monthly   Often   Very Often   Daily  
(No more than 4 times/year)   (2- 3 times/month)   (Weekly or biweekly)

5. We work together to make important decisions in the school:

Never   Occasionally   Monthly   Often   Very Often   Daily  
(No more than 4 times/year)   (2- 3 times/month)   (Weekly or biweekly)

6. We give each other helpful feedback about our teaching practices:

Never   Occasionally   Monthly   Often   Very Often   Daily  
(No more than 4 times/year)   (2- 3 times/month)   (Weekly or biweekly)

7. We gather as a faculty to discuss professional matters:

Never   Occasionally   Monthly   Often   Very Often   Daily  
(No more than 4 times/year)   (2- 3 times/month)   (Weekly or biweekly)

8. We meet in committees to accomplish tasks that serve the mission of the school:

Never      Occasionally      Monthly      Often      Very Often      Daily  
 (No more than 4 times/year)      (2- 3 times/month)      (Weekly or biweekly)

### **Part II Directions.**

These eight items ask you to indicate your agreement with statements about you as an individual teacher. Please respond to each statement by circling the number that corresponds to your level of agreement. There are no "right" or "wrong" responses.

Strongly disagree	Moderately disagree	Disagree slightly	Agree slightly	Moderately agree	Strongly agree
1	2	3	4	5	6

1. If I try really hard, I can get through to even the most difficult or unmotivated students.  
           1                      2                      3                      4                      5                      6
2. If a student masters a new concept or skill quickly, it's because of the instructional strategies I employed.  
           1                      2                      3                      4                      5                      6
3. The hours in my classroom have little influence on students compared to their home environment.  
           1                      2                      3                      4                      5                      6
4. If a student in my class becomes disruptive and noisy, I can redirect him or her quickly.  
           1                      2                      3                      4                      5                      6
5. When a student is having difficulty with an assignment or task, I feel there is little I can do.  
           1                      2                      3                      4                      5                      6
6. When the grades of my students improve, it is usually because I found more effective teaching approaches.  
           1                      2                      3                      4                      5                      6
7. If a student did not remember information I gave in a previous lesson, I would know how to increase his or her retention in the next lesson.  
           1                      2                      3                      4                      5                      6
8. When a student does better than usual, it is often because I exerted a little extra effort.  
           1                      2                      3                      4                      5                      6

### **Part III Directions.**

These eight items ask you to indicate your agreement with statements about you and your colleagues as a whole about teaching and learning. Please respond to the following items by circling the number below the statement that indicates your level of agreement with it. There are no "right" or "wrong" responses. "We" refers to you and the teachers in your school.

1. We have the necessary skills and knowledge to be effective teachers.  
           1                      2                      3                      4                      5                      6
2. When all factors are considered, I am confident that all students at my school can achieve the Learning Results.  
           1                      2                      3                      4                      5                      6

3. If we really try, we can get through to even the most difficult and unmotivated students.

1                      2                      3                      4                      5                      6

4. If we adopted a new curriculum, we would have the necessary skills to implement it successfully.

1                      2                      3                      4                      5                      6

5. When all factors are considered, we are not a very powerful influence on student achievement.

1                      2                      3                      4                      5                      6

6. We can create and implement local assessments of the Learning Results.

1                      2                      3                      4                      5                      6

7. The hours our students spend at school have little influence on them compared to the influence of factors outside of school.

1                      2                      3                      4                      5                      6

8. We have the ability to make achievement gains greater than those of comparable schools.

1                      2                      3                      4                      5                      6

#### **Part IV Directions.**

**Please consider these statements about various aspects of your school. Indicate your agreement or disagreement with the statement according to the same scale used in Parts II and III. Again, there are no "right" or "wrong" responses.**

**"We" refers to you and the teachers in your school.**

1. We encourage each other to try new ideas.

1                      2                      3                      4                      5                      6

2. We have a common set of learning outcomes that we're all trying to reach.

1                      2                      3                      4                      5                      6

3. Teachers from one subject area respect those from other subject areas.

1                      2                      3                      4                      5                      6

4. Teachers at this school are reluctant to tell colleagues about problems they are having with students.

1                      2                      3                      4                      5                      6

5. My educational philosophy is the same as my colleagues.

1                      2                      3                      4                      5                      6

6. While teachers don't always agree, we accept each other's views.

1                      2                      3                      4                      5                      6

7. The support of my colleagues is important to my improvement as a teacher.

1                      2                      3                      4                      5                      6

8. Teachers at this school generally agree on the skills and attitudes we want our students to demonstrate.

1                      2                      3                      4                      5                      6

9. We do not have a clear vision of how to fulfill the school's goals.  
1 2 3 4 5 6
10. Teachers in this school have integrity.  
1 2 3 4 5 6
11. If I need help, I feel comfortable going to my colleagues.  
1 2 3 4 5 6
12. Teachers in this school like each other.  
1 2 3 4 5 6
13. Students in this school know what we expect them to learn.  
1 2 3 4 5 6
14. Even in difficult situations, teachers in this school can depend on one another.  
1 2 3 4 5 6
15. Our goals reflect our unique school and the beliefs we have about the needs of our students.  
1 2 3 4 5 6
16. We feel like a "team" here.  
1 2 3 4 5 6

# Appendix B

Reliability Statistics (after recoding) for All Variables:  
Teacher Efficacy (TE), Collective Efficacy (CE), Total Efficacy, Collaborative Climate (CC),  
Collegiality (COLLEG), Shared Goals (GOALS), and Collaborative Work (WORK).

Table B.1: Reliability Statistics for Teacher Efficacy (TE).

N of Cases = 365.0

Statistics for	Mean	Variance	Std Dev	Variables
Scale	33.6630	19.0922	4.3695	8

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	4.2079	3.3123	5.4603	2.1479	1.6485	.4177

## Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
ITEM2.1	29.5123	13.9758	.2962	.1187	.5560
ITEM2.2	29.6000	15.8451	.3042	.1425	.5493
ITEM2.3	30.3507	15.6679	.1713	.0530	.5981
ITEM2.4	28.9068	16.4309	.2335	.1246	.5685
ITEM2.5	28.2027	17.2885	.1866	.1216	.5792
ITEM2.6	29.6137	14.7597	.4463	.2730	.5073
ITEM2.7	29.5616	15.1260	.3650	.1666	.5300
ITEM2.8	29.8932	14.7660	.3655	.2176	.5279

Reliability Coefficients      8 items      Alpha = .5858      Standardized item alpha = .5975

Table B.2: Reliability Statistics for Collective Efficacy (CE).

N of Cases = 355.0

Statistics for	Mean	Variance	Std Dev	Variables
Scale	32.4732	30.3517	5.5092	8

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	4.0592	3.1803	5.1437	1.9634	1.6174	.4461

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
ITEM3.1	27.3296	27.5662	.2343	.1588	.6433
ITEM3.2	29.2930	22.3603	.4196	.2893	.5970
ITEM3.3	28.9746	22.1660	.4556	.3129	.5861
ITEM3.4	28.6676	22.1321	.4477	.2689	.5883
ITEM3.5	27.8225	24.7735	.3271	.1894	.6233
ITEM3.6	27.9972	25.7147	.2673	.0904	.6375
ITEM3.7	28.9239	24.4264	.2865	.1841	.6357
ITEM3.8	28.3042	26.0484	.2901	.1279	.6320

Reliability Coefficients 8 items

Alpha = .6504

Standardized item alpha = .6437

Table B.3: Reliability Statistics for Total Efficacy (TE and CE). N of Cases = 343.0

Statistics for	Mean	Variance	Std Dev	Variables
Scale	66.2711	70.1690	8.3767	16

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	4.1419	3.1953	5.4810	2.2857	1.7153	.4154

Item-total Statistics  
Scale

	Scale Mean if Item Deleted	Corrected Variance if Item Deleted	Item- Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
ITEM2.1	62.1108	59.2976	.4038	.3653	.7053
ITEM2.2	62.2216	64.4595	.3099	.2221	.7163
ITEM2.3	62.9708	62.1512	.3103	.3625	.7161
ITEM2.4	61.4956	66.5490	.1767	.1363	.7270
ITEM2.5	60.7901	67.2716	.1918	.2233	.7253
ITEM2.6	62.2070	63.9716	.3312	.3138	.7144
ITEM2.7	62.1487	63.9866	.3120	.2074	.7159
ITEM2.8	62.4956	63.9992	.2849	.2471	.7182
ITEM3.1	61.1137	66.8555	.1885	.1932	.7256
ITEM3.2	63.0758	59.7194	.3668	.2920	.7100
ITEM3.3	62.7580	56.0962	.5624	.5128	.6847
ITEM3.4	62.4373	60.5626	.3360	.2865	.7138
ITEM3.5	61.6006	61.7669	.3632	.3011	.7103
ITEM3.6	61.8017	63.5454	.2697	.1733	.7200
ITEM3.7	62.7405	59.8886	.3852	.4437	.7076
ITEM3.8	62.0991	64.5340	.2605	.1512	.7204

Reliability Coefficients    16 items    Alpha = .7278    Standardized item alpha = .7202

Table B.4: Reliability for Climate Composite (CC). N of Cases = 356.0

Statistics for	Mean	Variance	Std Dev	Variables		
Scale	95.3258	274.3837	16.5645	24		
Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.9719	2.0309	5.1517	3.1208	2.5367	.7916
Item-total Statistics			Corrected			
	Mean	Variance	Item-	Squared	Alpha	
	if Item	if Item	Total	Multiple	if Item	
	Deleted	Deleted	Correlation	Correlation	Deleted	
ITEM1.1	.91.5281	249.7823	.5233	.5338	.9109	
ITEM1.2	.92.4972	257.6648	.3988	.4039	.9131	
ITEM1.3	.91.6011	249.9531	.5306	.5514	.9107	
ITEM1.4	.93.2949	260.1635	.3972	.3707	.9129	
ITEM1.5	.92.4298	256.2232	.4509	.4606	.9121	
ITEM1.6	.92.8006	254.8700	.4741	.4322	.9117	
ITEM1.7	.92.4860	262.5716	.3640	.3156	.9134	
ITEM1.8	.92.4916	265.5689	.2239	.2759	.9158	
ITEM4.1	.90.8062	252.6074	.5812	.4227	.9097	
ITEM4.2	.91.2949	249.1325	.5826	.4686	.9095	
ITEM4.3	.90.7809	246.1659	.6180	.5093	.9087	
ITEM4.4	.90.8427	255.8062	.3851	.2370	.9139	
ITEM4.5	.91.6601	248.8729	.5725	.4068	.9097	
ITEM4.6	.90.8118	250.6659	.5852	.4971	.9095	
ITEM4.7	.90.5702	257.9528	.4078	.2726	.9129	
ITEM4.8	.90.6657	252.4992	.5974	.4946	.9094	
ITEM4.9	.91.6180	249.2339	.4891	.3663	.9119	
ITEM4.10	.90.1742	254.6118	.5968	.5368	.9097	
ITEM4.11	.90.2191	251.4392	.6667	.5434	.9084	
ITEM4.12	.90.5393	250.9872	.6551	.6498	.9085	
ITEM4.13	.90.7640	255.1780	.5379	.4348	.9105	
ITEM4.14	.90.4185	247.9736	.7040	.6889	.9074	
ITEM4.15	.90.8989	249.9109	.6852	.6151	.9079	
ITEM4.16	.91.3006	240.6446	.7506	.6461	.9057	
Reliability Coefficients	24 items Alpha =	.9140		Standardized item alpha =	.9151	

Table B.5: Reliability Statistics for Collegiality (COLLEG).

N of Cases = 377.0

Statistics for	Mean	Variance	Std Dev	Variables
Scale	46.7851	70.2862	8.3837	10

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	4.6785	4.0212	5.1592	1.1379	1.2830	.1133

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
ITEM4.1	42.2679	59.1541	.5699	.3648	.8803
ITEM4.3	42.2228	54.5992	.6839	.4948	.8723
ITEM4.4	42.3024	59.6104	.4200	.2086	.8932
ITEM4.6	42.2838	56.9857	.6511	.4587	.8747
ITEM4.7	42.0345	61.4961	.4167	.1938	.8904
ITEM4.10	41.6260	59.2507	.6641	.5085	.8751
ITEM4.11	41.6790	58.2504	.6889	.5118	.8730
ITEM4.12	41.9973	56.8058	.7559	.6297	.8682
ITEM4.14	41.8886	55.9822	.7677	.6656	.8668
ITEM4.16	42.7639	54.2872	.6994	.5287	.8710

Reliability Coefficients 10 items

Alpha = .8877

Standardized item alpha = .8919

Table B.6: Reliability for Shared Goals (GOALS).

N of Cases = 368.0

Statistics for	Mean	Variance	Std Dev	Variables
Scale	25.0734	28.1227	5.3031	6

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	4.1789	3.6603	4.6576	.9973	1.2725	.1901

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
ITEM4.13	20.5027	21.5967	.5620	.3418	.7948
ITEM4.15	20.6467	20.5561	.6599	.4447	.7757
ITEM4.2	21.0245	19.4681	.6259	.4005	.7795
ITEM4.5	21.4130	20.0033	.5433	.3156	.7988
ITEM4.8	20.4158	20.7449	.6226	.4042	.7824
ITEM4.9	21.3641	19.0714	.5340	.2963	.8059

Reliability Coefficients 6 items

Alpha = .8181      Standardized item alpha = .8260

Table B.7: Reliability for Collaborative Work (WORK).

N of Cases = 374.0

Statistics for Scale	Mean 23.4947	Variance 38.6421	Std Dev 6.2163	Variables 8
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Item Means	Mean 2.9368	Minimum 2.0374	Maximum 3.7888	Range 1.7513	Max/Min 1.8596	Variance .3330
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Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
ITEM1.1	19.7059	27.4039	.6525	.5147	.7792
ITEM1.2	20.6604	29.9621	.5450	.3892	.7961
ITEM1.3	19.7861	27.5520	.6530	.4883	.7791
ITEM1.4	21.4572	31.0102	.5711	.3593	.7937
ITEM1.5	20.5775	30.3572	.5365	.3909	.7973
ITEM1.6	20.9733	29.8116	.5712	.3868	.7923
ITEM1.7	20.6444	33.2914	.4225	.2778	.8118
ITEM1.8	20.6578	33.4429	.3349	.2184	.8225

Reliability Coefficients 8 items

Alpha = .8181      Standardized item alpha = .8149

# **Appendix C: Descriptive Data and Correlations of Variables for the Entire Sample**

**Table C.1: Rate of Response and Descriptive Data (Years of Teaching Experience and Tenure at School) at Teacher-level, School-level, and Within Schools.**

	n	Rate of Response	M Years Experience	Min	Max	M Years at School	Min	Max
Teacher-level	384	48	16.92	1.00	37.00	11.59	0.50	36.50
School-level	15	71	17.05	1.00	37.00	12.30	.50	36.50
<b>Within Schools</b>								
School 1	27	58	16.19	3.00	31.00	12.07	0.75	27.00
School 2	32	63	16.34	2.00	30.00	9.91	1.00	29.00
School 3	32	52	18.89	3.00	35.00	13.31	1.00	31.00
School 4	20	33	16.20	0.00	33.00	10.30	0.00	30.00
School 5	14	24	15.71	0.00	37.00	11.86	0.00	30.00
School 6	14	31	11.93	0.00	30.00	4.21	0.00	16.00
School 7	11	50	17.68	2.00	35.00	13.91	1.00	35.00
School 8	18	57	19.17	3.00	38.00	13.61	3.00	35.00
School 9	19	38	14.11	0.00	30.00	6.47	0.00	21.00
School 10	12	56	20.08	1.00	36.00	14.17	1.00	34.00
School 11	19	54	17.68	1.00	36.00	12.47	1.00	31.00
School 12	20	58	17.60	2.00	34.00	10.50	2.00	34.00
School 14	17	67	18.59	6.00	32.00	13.12	3.00	32.00
School 15	5	23	18.40	10.00	31.00	17.00	9.00	30.00
School 16	3	21	21.67	10.00	35.00	19.00	10.00	32.00
School 17	11	52	16.73	4.00	30.00	13.73	1.00	30.00
School 18	11	50	16.32	4.00	34.00	11.27	1.00	24.00
School 19	11	54	14.18	2.00	30.00	11.73	1.00	30.00
School 20	14	63	14.21	2.00	32.00	12.00	2.00	29.00
School 21	13	58	16.62	2.00	33.00	12.92	1.00	33.00
School 23	37	59	15.41	1.00	37.00	9.72	0.50	37.00

Table C.2: Descriptive Data for Entire Sample: Teacher-level, School-level, and Within Schools.

	n	Teacher Efficacy M	Teacher Efficacy SD	Collective Efficacy M	Collective Efficacy SD	Climate Composite M	Climate Composite SD
Teacher-level	384	4.20	0.57	4.05	0.72	3.97	0.70
School-level	15	4.21	0.16	4.04	0.37	4.55	0.52
Schools--all	21	4.24	0.18	4.09	0.34	4.72	0.54
Within Schools							
School 1	29	4.24	0.45	3.78	0.65	3.53	0.53
School 2	33	4.12	0.47	4.05	0.63	4.08	0.53
School 3	34	3.97	0.52	3.63	0.75	3.91	0.60
School 4	20	4.20	0.51	4.19	0.61	4.24	0.64
School 5	14	4.38	0.82	3.99	0.73	3.74	0.60
School 6	14	4.23	0.45	4.63	0.72	4.47	0.70
School 7	12	3.90	0.71	3.41	0.99	4.02	0.86
School 8	19	4.44	0.56	4.13	0.65	3.94	0.55
School 9	19	4.03	0.53	4.20	0.51	4.37	0.47
School 10	14	4.35	0.46	3.76	0.71	2.80	0.88
School 11	19	4.38	0.40	4.39	0.58	4.38	0.58
School 12	22	4.28	0.57	4.13	0.69	4.09	0.66
School 14	20	4.06	0.48	3.86	0.64	3.61	0.68
School 15	5	4.63	0.27	4.22	0.14	4.21	0.59
School 16	3	4.42	0.36	4.13	0.45	4.71	0.08
School 17	11	4.36	0.41	3.97	0.49	3.61	0.75
School 18	11	4.43	0.61	5.00	0.37	4.48	0.26
School 19	13	4.14	0.59	4.24	0.57	3.78	0.94
School 20	15	4.19	0.44	3.92	0.60	3.91	0.39
School 21	14	4.13	0.59	4.13	0.55	4.01	0.71
School 23	41	4.16	0.82	4.16	0.81	4.09	0.57

Table C.2 (cont.)

	n	Collegiality M	Collegiality SD	Shared Goals M	Shared Goals SD	Collab Work M	Collab Work SD
Teacher-level	384	4.67	0.85	4.17	0.90	2.95	0.79
School-level	15	3.88	0.40	4.08	0.47	2.90	0.36
Schools-All	21	4.00	0.42	4.20	0.47	2.94	0.36
Within Schools							
School 1	29	4.02	0.60	3.59	0.78	2.88	0.72
School 2	33	4.61	0.59	4.29	0.77	3.27	0.73
School 3	34	4.50	0.71	4.32	0.67	2.87	0.74
School 4	20	5.07	0.72	4.54	0.77	2.99	0.89
School 5	14	4.59	0.77	3.94	0.63	2.51	0.83
School 6	14	5.29	0.72	4.45	0.95	3.45	0.84
School 7	12	4.85	0.92	3.93	1.21	3.02	0.79
School 8	19	4.68	0.57	4.33	0.80	2.73	0.93
School 9	19	5.31	0.54	4.59	0.68	3.03	0.61
School 10	14	3.08	1.11	3.12	1.15	2.22	0.72
School 11	19	4.91	0.68	4.34	0.79	3.76	0.62
School 12	22	5.03	0.84	4.26	0.93	2.79	0.45
School 14	20	4.20	0.88	3.84	0.72	2.69	0.71
School 15	5	5.14	0.40	4.43	0.70	2.84	0.82
School 16	3	5.50	0.30	5.00	0.17	3.50	0.45
School 17	11	4.40	0.65	3.79	1.16	2.50	0.90
School 18	11	5.28	0.42	5.18	0.56	2.98	0.74
School 19	13	4.42	1.17	4.31	1.06	2.60	0.79
School 20	15	4.73	0.33	3.60	0.62	3.12	0.78
School 21	14	4.74	0.83	4.13	0.91	3.02	0.65
School 23	41	4.86	0.69	4.25	0.86	3.05	0.70

Table C.3: Correlations Between Teacher Efficacy and Other Variables at the Teacher-level, School-level and Within Schools.

Correlations between Teacher Efficacy and						
	n	Collective Efficacy	Climate Composite	Collegiality	Shared Goals	Collaborative Work
Teacher-level	384	.44**	.10*	.08	.05	.08
School-level	15	.64*	.01(-)	.01	.14	.09(-)
Schools-All	21	.48*	.10	.09	.18	.06(-)
Within Schools						
School 1	29	.41**	.01	.11	.02	.12(-)
School 2	34	.32*	.04	.04(-)	.15	.02
School 3	34	.41*	.25	.39*	.07	.09
School 4	20	.63**	.02(-)	.13(-)	.20	.04(-)
School 5	14	.50*	.09(-)	.05(-)	.15(-)	.02(-)
School 6	14	.32	.15(-)	.16(-)	.16(-)	.04(-)
School 7	12	.63*	.70**	.60*	.65*	.66**
School 8	19	.36	.30	.38	.03(-)	.29
School 9	19	.33	.08(-)	.21(-)	.28(-)	.28
School 10	14	.07	.43	.55*	.35	.11
School 11	19	.32	.28	.18	.32	.20
School 12	22	.19	.12(-)	.13(-)	.19(-)	.03
School 14	20	.49*	.47*	.45*	.34	.37
School 15	5	.40	.60	.28	.75	.56
School 16	3	.24	.87	.00	.87	.24
School 17	11	.43	.24	.06	.19	.36
School 18	11	.35	.18	.26(-)	.02(-)	.38
School 19	13	.72**	.13(-)	.14(-)	.16(-)	.04(-)
School 20	15	.43	.34(-)	.06(-)	.02(-)	.47*(-)
School 21	14	.35	.09(-)	.25(-)	.06(-)	.16
School 23	41	.64**	.16	.11	.02(-)	.06

\*  $p < .05$

\*\*  $p < .01$

Table C.4: Correlations Between Collective Efficacy and Other Variables at the Teacher-level, School-level and Within Schools.

Correlations between Collective Efficacy and					
	n	Climate Composite	Collegiality	Shared Goals	Collaborative Work
Teacher-level	384	.38**	.33**	.36**	.23**
School-level	15	.50*	.56*	.73**	.26
Schools-All	21	.55**	.59**	.68**	.35
Within Schools					
School 1	29	.24	.22	.20	.15
School 2	33	.49**	.50**	.56**	.10
School 3	34	.42***	.41**	.39*	.25
School 4	18	.22(-)	.16(-)	.07(-)	.26(-)
School 5	13	.51*	.39	.60*	.32
School 6	14	.27	.40	.17	.10
School 7	12	.55*	.37	.68**	.45
School 8	19	.66**	.62**	.35	.51*
School 9	19	.07	.17	.20	.19(-)
School 10	14	.28	.11	.28	.48*
School 11	19	.38	.14	.48*	.38
School 12	22	.18	.12	.17	.25
School 14	20	.46*	.42*	.36	.34
School 15	5	.15(-)	.21(-)	.02(-)	.26(-)
School 16	3	.69	.97(-)	.69	1 .00**
School 17	11	.47	.30	.61*	.32
School 18	11	.03(-)	.02	.21(-)	.07
School 19	13	.24	.25	.27	.13
School 20	15	.21	.24	.08	.13
School 21	14	.33	.33	.25	.30
School 23	41	.22	.09	.10	.12

\*  $p < .05$

\*\*  $p < .01$

Table C.5: Correlations Between Collaborative Climate (composite) and Other Collaborative Climate Variables and Intercorrelations of the Collaborative Climate Variables at the Teacher-level, School-level and Within Schools.

	n	Correlations between Collaborative Climate and			Intercorrelations between		
		Collegiality	Shared Goals	Collaborative Work	Collegiality and Work	Collegiality and Goals	Goals and Work
Teacher-level	384	.91**	.84**	.73**	.44**	.74**	.42**
School -level	15	.96**	.79**	.63**	.76**	.85**	.41
Schools--All	21	.97**	.89**	.66**	.79**	.89**	.52**
Within Schools							
School 1	29	.85**	.77**	.70**	.34*	.62**	.27
School 2	33	.85**	.85**	.64**	.19	.80**	.24
School 3	34	.87**	.85**	.80**	.46**	.66**	.59**
School 4	18	.85**	.79**	.79**	.42*	.61**	.43*
School 5	13	.86**	.81**	.70**	.29	.69**	.37
School 6	14	.89**	.92**	.75**	.42	.87**	.50*
School 7	12	.94**	.93**	.83**	.66**	.84**	.66**
School 8	19	.76**	.77**	.74**	.24	.58**	.30
School 9	19	.88**	.85**	.61**	.22	.85**	.18
School 10	14	.92**	.97**	.75**	.44	.83**	.76**
School 11	19	.88**	.85**	.79**	.48*	.63**	.56**
School 12	22	.98**	.92**	.74**	.66**	.89**	.47*
School 14	20	.91**	.79**	.82**	.56**	.61**	.56**
School 15	5	.91*	.97**	.98**	.86*	.83**	.93**
School 16	3	.50(-)	1.00**	.69	.97(-)	.50(-)	.69
School 17	11	.95**	.86**	.83**	.71**	.80**	.47
School 18	11	.65*	.13(-)	.67*	.05	.13(-)	.60(-)
School 19	13	.98**	.89**	.85**	.76**	.85**	.63**
School 20	15	.62**	.66**	.77**	.11	.48*	.14
School 21	14	.94**	.93**	.79**	.58*	.85**	.62**
School 23	41	.86**	.77**	.66**	.29*	.63**	.29*

\*  $p < .05$

\*\*  $p < .01$

# **Appendix D:** **Descriptive Statistics and Correlations of Variables by School**

Table D.1: Descriptive statistics and Correlations of Variables for School 1.

Variable	Cases	Mean	Std Dev
TE	29	4.2401	.4458
CE	29	3.7750	.6516
CC	29	3.5329	.5257
COLLEG	29	4.0195	.5997
GOALS	29	3.5891	.7747
WORK	29	2.8750	.7024
FORMAL	29	2.7586	.6320
INFORMAL	29	2.9914	.8826

- - Correlation Coefficients - -

	TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	1.0000	.4124*	.0080	.1050	.0156	-.1212	-.1145	-.1108
CE	.4124*	1.0000	.2443	.2186	.2028	.1546	.1262	.1556
CC	.0080	.2443	1.0000	.8526**	.7727**	.7033**	.7404**	.5892**
COLLEG	.1050	.2186	.8526**	1.0000	.6184**	.3353*	.4338**	.2230
GOALS	.0156	.2028	.7727**	.6184**	1.0000	.2701	.3707*	.1644
WORK	-.1212	.1546	.7033**	.3353*	.2701	1.0000	.8975**	.9488**
FORMAL	-.1145	.1262	.7404**	.4338**	.3707*	.8975**	1.0000	.7124**
INFORMAL	-.1108	.1556	.5892**	.2230	.1644	.9488**	.7124**	1.0000

\* - Signif. LE .05      \*\* - Signif. LE .01      (1-tailed)  
 " . " is printed if a coefficient cannot be compute

Table D.2: Descriptive statistics and Correlations of Variables for School 2.

Variable	Cases	Mean	Std Dev
TE	34	4.1180	.4737
CE	33	4.0509	.6298
CC	34	4.0821	.5286
COLLEG	34	4.6088	.5905
GOALS	34	4.2892	.7712
WORK	34	3.2684	.7341
FORMAL	34	2.8382	.8525
INFORMAL	34	3.6985	.9609

- - Correlation Coefficients - -

	TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	1.0000	.3178*	.0435	-.0430	.1454	.0226	.1400	-.0897
CE	.3178*	1.0000	.4921**	.5023**	.5563**	.0961	.1125	.0433
CC	.0435	.4921**	1.0000	.8455**	.8501**	.6402**	.5200**	.5169**
COLLEG	-.0430	.5023**	.8455**	1.0000	.8004**	.1901	.1820	.1290
GOALS	.1454	.5563**	.8501**	.8004**	1.0000	.2434	.2001	.1945
WORK	.0226	.0961	.6402**	.1901	.2434	1.0000	.7826**	.8336**
FORMAL	.1400	.1125	.5200**	.1820	.2001	.7826**	1.0000	.3086*
INFORMAL	-.0897	.0433	.5169**	.1290	.1945	.8336**	.3086*	1.0000

\* - Signif. LE .05      \*\* - Signif. LE .01      (1-tailed)  
 " . " is printed if a coefficient cannot be computed

Table D.3: Descriptive statistics and Correlations of Variables for School 3.

Variable	Cases	Mean	Std Dev
TE	34	3.9743	.5238
CE	34	3.6282	.7527
CC	34	3.9067	.6002
COLLEG	34	4.4948	.7144
GOALS	34	4.3176	.6723
WORK	34	2.8676	.7379
FORMAL	34	2.5662	.5751
INFORMAL	34	3.1691	1.1542

- - Correlation Coefficients - -

	TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	1.0000	.4089**	.2524	.3890*	.0730	.0901	.2259	.0027
CE	.4089**	1.0000	.4200**	.4131**	.3869*	.2496	.3186*	.1604
CC	.2524	.4200**	1.0000	.8715**	.8509**	.8014**	.6054**	.7230**
COLLEG	.3890*	.4131**	.8715**	1.0000	.6646**	.4567**	.3965*	.3864*
GOALS	.0730	.3869*	.8509**	.6646**	1.0000	.5900**	.4398**	.5353**
WORK	.0901	.2496	.8014**	.4567**	.5900**	1.0000	.6930**	.9333**
FORMAL	.2259	.3186*	.6054**	.3965*	.4398**	.6930**	1.0000	.3878*
INFORMAL	.0027	.1604	.7230**	.3864*	.5353**	.9333**	.3878*	1.0000

\* - Signif. LE .05      \*\* - Signif. LE .01      (1-tailed)

" . " is printed if a coefficient cannot be computed

Table D.4: Descriptive statistics and Correlations of Variables for School 4.

Variable	Cases	Mean	Std Dev
TE	20	4.1975	.5135
CE	20	4.1875	.6104
CC	20	4.2440	.6425
COLLEG	20	5.0700	.7197
GOALS	20	4.5383	.7660
WORK	20	2.9875	.8949
FORMAL	20	2.7375	.7842
INFORMAL	20	3.2375	1.1253

- - Correlation Coefficients - -

	TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	1.0000	.6303**	-.0226	-.1334	.2033	-.0398	-.1071	.0113
CE	.6303**	1.0000	-.2191	-.1632	-.0692	-.2575	-.3522	-.1640
CC	-.0226	-.2191	1.0000	.8453**	.7860**	.7942**	.7942**	.7098**
COLLEG	-.1334	-.1632	.8453**	1.0000	.6129**	.4202*	.4609*	.3472
GOALS	.2033	-.0692	.7860**	.6129**	1.0000	.4346*	.5112*	.3349
WORK	-.0398	-.2575	.7942**	.4202*	.4346*	1.0000	.9091**	.9569**
FORMAL	-.1071	-.3522	.7942**	.4609*	.5112*	.9091**	1.0000	.7491**
INFORMAL	.0113	-.1640	.7098**	.3472	.3349	.9569**	.7491**	1.0000

\* - Signif. LE .05      \*\* - Signif. LE .01      (1-tailed)

" . " is printed if a coefficient cannot be computed

Table D.5: Descriptive statistics and Correlations of Variables for School 5.

Variable	Cases	Mean	Std Dev
TE	14	4.3839	.8167
CE	14	3.9911	.7296
CC	14	3.7445	.6045
COLLEG	14	4.5905	.7694
GOALS	14	3.9405	.6257
WORK	14	2.5149	.8252
FORMAL	14	2.2500	.8716
INFORMAL	14	2.7500	.9146

- - Correlation Coefficients - -

	TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	1.0000	.5024*	-.0902	-.0458	-.1463	-.0163	-.0101	.0290
CE	.5024*	1.0000	.5086*	.3920	.5990*	.3196	.2268	.3602
CC	-.0902	.5086*	1.0000	.8609**	.8061**	.7012**	.5165*	.7363**
COLLEG	-.0458	.3920	.8609**	1.0000	.6885**	.2891	.0688	.4072
GOALS	-.1463	.5990*	.8061**	.6885**	1.0000	.3712	.2939	.3584
WORK	-.0163	.3196	.7012**	.2891	.3712	1.0000	.9158**	.9395**
FORMAL	-.0101	.2268	.5165*	.0688	.2939	.9158**	1.0000	.7298**
INFORMAL	.0290	.3602	.7363**	.4072	.3584	.9395**	.7298**	1.0000

\* - Signif. LE .05      \*\* - Signif. LE .01      (1-tailed)

" . " is printed if a coefficient cannot be computed

Table D.6: Descriptive statistics and Correlations of Variables for School 6.

Variable	Cases	Mean	Std Dev
TE	14	4.2283	.4536
CE	14	4.6301	.7232
CC	14	4.4696	.6958
COLLEG	14	5.2929	.7195
GOALS	14	4.4524	.9528
WORK	14	3.4452	.8381
FORMAL	14	3.1488	.7715
INFORMAL	14	3.7321	1.0940

- - Correlation Coefficients - -

	TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	1.0000	.3186	-.1450	-.1592	-.1610	-.0368	.0649	-.0873
CE	.3186	1.0000	.2658	.4042	.1708	.0988	.1832	.0414
CC	-.1450	.2658	1.0000	.8945**	.9160**	.7506**	.8317**	.5629*
COLLEG	-.1592	.4042	.8945**	1.0000	.8691**	.4164	.5899*	.2271
GOALS	-.1610	.1708	.9160**	.8691**	1.0000	.4959*	.6920**	.2697
WORK	-.0368	.0988	.7506**	.4164	.4959*	1.0000	.8493**	.9288**
FORMAL	.0649	.1832	.8317**	.5899*	.6920**	.8493**	1.0000	.5939*
INFORMAL	-.0873	.0414	.5629*	.2271	.2697	.9288**	.5939*	1.0000

\* - Signif. LE .05      \*\* - Signif. LE .01      (1-tailed)

" . " is printed if a coefficient cannot be computed

Table D.7: Descriptive statistics and Correlations of Variables for School 7.

Variable	Cases	Mean	Std Dev
TE	12	3.8958	.7088
CE	12	3.4107	.9868
CC	12	4.0168	.8602
COLLEG	12	4.8500	.9200
GOALS	12	3.9306	1.2091
WORK	12	3.0238	.7926
FORMAL	12	2.6250	.8360
INFORMAL	12	3.4236	.9465

- - Correlation Coefficients - -

	TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	1.0000	.6255*	.6984**	.5995*	.6538*	.6608**	.6185*	.5602*
CE	.6255*	1.0000	.5500*	.3744	.6769**	.4516	.5731*	.2512
CC	.6984**	.5500*	1.0000	.9411**	.9314**	.8299**	.7345**	.7409**
COLLEG	.5995*	.3744	.9411**	1.0000	.8370**	.6639**	.5408*	.6338*
GOALS	.6538*	.6769**	.9314**	.8370**	1.0000	.6637**	.6502*	.5378*
WORK	.6608**	.4516	.8299**	.6639**	.6637**	1.0000	.8729**	.9027**
FORMAL	.6185*	.5731*	.7345**	.5408*	.6502*	.8729**	1.0000	.5781*
INFORMAL	.5602*	.2512	.7409**	.6338*	.5378*	.9027**	.5781*	1.0000

\* - Signif. LE .05      \*\* - Signif. LE .01      (1-tailed)

" . " is printed if a coefficient cannot be computed

Table D.8: Descriptive Statistics and Correlations of Variables for School 8.

Variable	Cases	Mean	Std Dev	-- Correlation Coefficients --							
				TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	20	4.4438	.5612	1.0000	.3567	.3005	.3765	-.0347	.2896	.2327	.2944
CE	20	4.1250	.6451	.3567	1.0000	.6636**	.6184**	.3538	.5115*	.4571*	.4769*
CC	20	3.9354	.5462	.3005	.6636**	1.0000	.7699**	.7742**	.7350**	.7414**	.6062**
COLLEG	19	4.6842	.5728	.3765	.6184**	.7699**	1.0000	.5841**	.2373	.2888	.1472
GOALS	19	4.3246	.8021	-.0347	.3538	.7742**	.5841**	1.0000	.3005	.4354*	.1245
WORK	20	2.7250	.9271	.2896	.5115*	.7350**	.2373	.3005	1.0000	.9076**	.9194**
FORMAL	20	2.6375	.9817	.2327	.4571*	.7414**	.2888	.4354*	.9076**	1.0000	.6692**
INFORMAL	20	2.8125	1.0478	.2944	.4769*	.6062**	.1472	.1245	.9194**	.6692**	1.0000

\* - Signif. LE .05    \*\* - Signif. LE .01    (1-tailed)  
 " . " is printed if a coefficient cannot be computed

Table D.9: Descriptive statistics and Correlations of Variables for School 9.

Variable	Cases	Mean	Std Dev
TE	19	4.0329	.5268
CE	19	4.2008	.5096
CC	19	4.3712	.4679
COLLEG	19	5.3105	.5446
GOALS	19	4.5877	.6767
WORK	19	3.0329	.6093
FORMAL	19	2.6842	.6115
INFORMAL	19	3.3816	.8181

- - Correlation Coefficients - -

	TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	1.0000	.3308	-.0821	-.2143	-.2845	.2831	.3520	.1586
CE	.3308	1.0000	.0742	.1678	.2048	-.1875	-.0102	-.2717
CC	-.0821	.0742	1.0000	.8849**	.8506**	.6076**	.5381**	.5029*
COLLEG	-.2143	.1678	.8849**	1.0000	.8466**	.2187	.2525	.1370
GOALS	-.2845	.2048	.8506**	.8466**	1.0000	.1835	.1881	.1327
WORK	.2831	-.1875	.6076**	.2187	.1835	1.0000	.7983**	.8929**
FORMAL	.3520	-.0102	.5381**	.2525	.1881	.7983**	1.0000	.4417*
INFORMAL	.1586	-.2717	.5029*	.1370	.1327	.8929**	.4417*	1.0000

\* - Signif. LE .05      \*\* - Signif. LE .01      (1-tailed)

" . " is printed if a coefficient cannot be computed

Table D.10: Descriptive statistics and Correlations of Variables for School 10.

Variable	Cases	Mean	Std Dev
TE	14	4.3508	.4547
CE	14	3.7615	.7116
CC	14	2.8028	.8831
COLLEG	14	3.0786	1.1137
GOALS	14	3.1190	1.1499
WORK	14	2.2232	.7159
FORMAL	14	2.0179	.5044
INFORMAL	14	2.4286	1.0163

- - Correlation Coefficients - -

	TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	1.0000	.0694	.4338	.5496*	.3510	.1113	.0919	.1112
CE	.0694	1.0000	.2804	.1062	.2839	.4807*	.4184	.4694*
CC	.4338	.2804	1.0000	.9157**	.9668**	.7513**	.5193*	.8006**
COLLEG	.5496*	.1062	.9157**	1.0000	.8270**	.4431	.1924	.5286*
GOALS	.3510	.2839	.9668**	.8270**	1.0000	.7615**	.5541*	.7976**
WORK	.1113	.4807*	.7513**	.4431	.7615**	1.0000	.8801**	.9718**
FORMAL	.0919	.4184	.5193*	.1924	.5541*	.8801**	1.0000	.7435**
INFORMAL	.1112	.4694*	.8006**	.5286*	.7976**	.9718**	.7435**	1.0000

\* - Signif. LE .05      \*\* - Signif. LE .01      (1-tailed)

" . " is printed if a coefficient cannot be computed

Table D.11: Descriptive statistics and Correlations of Variables for School 11.

Variable	Cases	Mean	Std Dev
TE	19	4.3816	.4028
CE	19	4.3900	.5802
CC	19	4.3838	.5775
COLLEG	19	4.9047	.6770
GOALS	19	4.3386	.7907
WORK	19	3.7622	.6183
FORMAL	19	3.8202	.5920
INFORMAL	19	3.7061	.7214

- - Correlation Coefficients - -

	TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	1.0000	.3200	.2766	.1812	.3240	.1958	.2794	.1086
CE	.3200	1.0000	.3753	.1358	.4811*	.3828	.3956*	.3331
CC	.2766	.3753	1.0000	.8757**	.8492**	.7868**	.6737**	.7978**
COLLEG	.1812	.1358	.8757**	1.0000	.6272**	.4845*	.3718	.5263*
GOALS	.3240	.4811*	.8492**	.6272**	1.0000	.5606**	.4653*	.5800**
WORK	.1958	.3828	.7868**	.4845*	.5606**	1.0000	.9305**	.9537**
FORMAL	.2794	.3956*	.6737**	.3718	.4653*	.9305**	1.0000	.7773**
INFORMAL	.1086	.3331	.7978**	.5263*	.5800**	.9537**	.7773**	1.0000

\* - Signif. LE .05      \*\* - Signif. LE .01      (1-tailed)

" . " is printed if a coefficient cannot be computed

Table D.12: Descriptive statistics and Correlations of Variables for School 12.

Variable	Cases	Mean	Std Dev
TE	22	4.2781	.5688
CE	22	4.1307	.6927
CC	22	4.0949	.6644
COLLEG	22	5.0318	.8386
GOALS	22	4.2576	.9306
WORK	22	2.7930	.4509
FORMAL	22	2.2955	.3589
INFORMAL	22	3.2841	.7879

- - Correlation Coefficients - -

	TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	1.0000	.1880	-.1249	-.1263	-.1893	.0325	-.3044	.1668
CE	.1880	1.0000	.1792	.1216	.1694	.2497	-.0131	.2995
CC	-.1249	.1792	1.0000	.9814**	.9181**	.7367**	.2647	.7329**
COLLEG	-.1263	.1216	.9814**	1.0000	.8878**	.6594**	.2046	.6685**
GOALS	-.1893	.1694	.9181**	.8878**	1.0000	.4711*	.1166	.5043**
WORK	.0325	.2497	.7367**	.6594**	.4711*	1.0000	.4919*	.9226**
FORMAL	-.3044	-.0131	.2647	.2046	.1166	.4919*	1.0000	.1206
INFORMAL	.1668	.2995	.7329**	.6685**	.5043**	.9226**	.1206	1.0000

\* - Signif. LE .05      \*\* - Signif. LE .01      (1-tailed)

" . " is printed if a coefficient cannot be computed

Table D.13: Descriptive statistics and Correlations of Variables for School 14.

Variable	Cases	Mean	Std Dev
TE	20	4.0625	.4778
CE	21	3.8639	.6427
CC	21	3.6114	.6825
COLLEG	21	4.2021	.8764
GOALS	21	3.8349	.7235
WORK	21	2.6845	.7133
FORMAL	21	2.5119	.6045
INFORMAL	21	2.8810	1.1281

- - Correlation Coefficients - -

	TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	1.0000	.4885*	.4746*	.4523*	.3419	.3653	.2158	.3602
CE	.4885*	1.0000	.4599*	.4188*	.3614	.3433	.0538	.4494*
CC	.4746*	.4599*	1.0000	.9097**	.7913**	.8162**	.4305*	.8433**
COLLEG	.4523*	.4188*	.9097**	1.0000	.6101**	.5619**	.2534	.6126**
GOALS	.3419	.3614	.7913**	.6101**	1.0000	.5594**	.1305	.6486**
WORK	.3653	.3433	.8162**	.5619**	.5594**	1.0000	.7230**	.9180**
FORMAL	.2158	.0538	.4305*	.2534	.1305	.7230**	1.0000	.3962*
INFORMAL	.3602	.4494*	.8433**	.6126**	.6486**	.9180**	.3962*	1.0000

\* - Signif. LE .05      \*\* - Signif. LE .01      (1-tailed)

" . " is printed if a coefficient cannot be computed

Table D.14: Descriptive statistics and Correlations of Variables for School 15.

Variable	Cases	Mean	Std Dev
TE	5	4.6321	.2677
CE	5	4.2250	.1369
CC	5	4.2098	.5884
COLLEG	5	5.1400	.3975
GOALS	5	4.4333	.7032
WORK	5	2.8429	.8181
FORMAL	5	2.5167	.8788
INFORMAL	5	3.1500	.7826

- - Correlation Coefficients - -

	TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	1.0000	.4018	.5993	.2777	.7501	.5644	.5259	.5475
CE	.4018	1.0000	-.1582	-.2067	-.0216	-.2630	-.3636	-.1750
CC	.5993	-.1582	1.0000	.9112*	.9745**	.9795**	.9395**	.9947**
COLLEG	.2777	-.2067	.9112*	1.0000	.8318*	.8561*	.7909	.9202*
GOALS	.7501	-.0216	.9745**	.8318*	1.0000	.9344**	.8845*	.9502**
WORK	.5644	-.2630	.9795**	.8561*	.9344**	1.0000	.9883**	.9856**
FORMAL	.5259	-.3636	.9395**	.7909	.8845*	.9883**	1.0000	.9497**
INFORMAL	.5475	-.1750	.9947**	.9202*	.9502**	.9856**	.9497**	1.0000

\* - Signif. LE .05    \*\* - Signif. LE .01    (1-tailed)  
 " . " is printed if a coefficient cannot be computed

Table D.15: Descriptive statistics and Correlations of Variables for School 16.

Variable	Cases	Mean	Std Dev
TE	3	4.4167	.3608
CE	3	4.1250	.4507
CC	3	4.7083	.0833
COLLEG	3	5.5000	.3000
GOALS	3	5.0000	.1667
WORK	3	3.5000	.4507
FORMAL	3	2.9167	.8780
INFORMAL	3	4.0833	.2887

- - Correlation Coefficients - -

	TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	1.0000	.2402	.8660	.0000	.8660	.2402	-.0822	1.0000**
CE	.2402	1.0000	.6934	-.9707	.6934	1.0000**	.9477	.2402
CC	.8660	.6934	1.0000	-.5000	1.0000**	.6934	.4271	.8660
COLLEG	.0000	-.9707	-.5000	1.0000	-.5000	-.9707	-.9966*	.0000
GOALS	.8660	.6934	1.0000**	-.5000	1.0000	.6934	.4271	.8660
WORK	.2402	1.0000**	.6934	-.9707	.6934	1.0000	.9477	.2402
FORMAL	-.0822	.9477	.4271	-.9966*	.4271	.9477	1.0000	-.0822
INFORMAL	1.0000**	.2402	.8660	.0000	.8660	.2402	-.0822	1.0000

\* - Signif. LE .05      \*\* - Signif. LE .01      (1-tailed)

" . " is printed if a coefficient cannot be computed

Table D.16: Descriptive statistics and Correlations of Variables for School 17.

Variable	Cases	Mean	Std Dev
TE	11	4.3568	.4076
CE	11	3.9705	.4895
CC	11	3.6118	.7511
COLLEG	11	4.4000	.6512
GOALS	11	3.7879	1.1573
WORK	11	2.5000	.8962
FORMAL	11	2.2500	.5701
INFORMAL	11	2.7500	1.3323

- - Correlation Coefficients - -

	TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	1.0000	.4259	.2376	.0622	.1915	.3627	.4922	.2774
CE	.4259	1.0000	.4688	.2988	.6145*	.3234	.2643	.3220
CC	.2376	.4688	1.0000	.9484**	.8562**	.8316**	.6352*	.8469**
COLLEG	.0622	.2988	.9484**	1.0000	.7984**	.7112**	.5792*	.7089**
GOALS	.1915	.6145*	.8562**	.7984**	1.0000	.4660	.2274	.5297*
WORK	.3627	.3234	.8316**	.7112**	.4660	1.0000	.8625**	.9763**
FORMAL	.4922	.2643	.6352*	.5792*	.2274	.8625**	1.0000	.7324**
INFORMAL	.2774	.3220	.8469**	.7089**	.5297*	.9763**	.7324**	1.0000

\* - Signif. LE .05      \*\* - Signif. LE .01      (1-tailed)

" . " is printed if a coefficient cannot be computed

Table D.17: Descriptive Statistics and Correlations of Variables for School 18.

Variable	Cases	Mean	Std Dev	-- Correlation Coefficients --							
				TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	11	4.4318	.6082	1.0000	.3464	.1836	-.2619	-.0151	.3846	.4476	.2755
CE	11	5.0000	.3708	.3464	1.0000	-.0324	.0162	-.2126	.0736	.4750	-.2146
CC	11	4.4848	.2604	.1836	-.0324	1.0000	.6500*	-.1280	.6666*	.3965	.7380**
COLLEG	11	5.2818	.4167	-.2619	.0162	.6500*	1.0000	-.1284	.0543	-.0898	.1439
GOALS	11	5.1818	.5551	-.0151	-.2126	-.1280	-.1284	1.0000	-.6041*	-.6620*	-.4609
WORK	11	2.9659	.7439	.3846	.0736	.6666*	.0543	-.6041*	1.0000	.8496**	.9321**
FORMAL	11	2.8636	.6742	.4476	.4750	.3965	-.0898	-.6620*	.8496**	1.0000	.6010*
INFORMAL	11	3.0682	.9816	.2755	-.2146	.7380**	.1439	-.4609	.9321**	.6010*	1.0000

\* - Signif. LE .05    \*\* - Signif. LE .01 (1-tailed)  
 " . " is printed if a coefficient cannot be computed

Table D.18: Descriptive statistics and Correlations of Variables for School 19.

Variable	Cases	Mean	Std Dev
TE	13	4.1442	.5860
CE	13	4.2349	.5646
CC	13	3.7734	.9433
COLLEG	13	4.4171	1.1670
GOALS	13	4.3077	1.0603
WORK	13	2.5962	.7875
FORMAL	13	2.4038	.6963
INFORMAL	13	2.7885	1.1675

- - Correlation Coefficients - -

	TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	1.0000	.7183**	-.1334	-.1434	-.1612	-.0438	-.1164	.0102
CE	.7183**	1.0000	.2425	.2487	.2748	.1257	.2307	.0320
CC	-.1334	.2425	1.0000	.9778**	.8942**	.8512**	.7465**	.7031**
COLLEG	-.1434	.2487	.9778**	1.0000	.8537**	.7592**	.7098**	.6009*
GOALS	-.1612	.2748	.8942**	.8537**	1.0000	.6290*	.6360**	.4693
WORK	-.0438	.1257	.8512**	.7592**	.6290*	1.0000	.7307**	.9134**
FORMAL	-.1164	.2307	.7465**	.7098**	.6360**	.7307**	1.0000	.3894
INFORMAL	.0102	.0320	.7031**	.6009*	.4693	.9134**	.3894	1.0000

\* - Signif. LE .05      \*\* - Signif. LE .01      (1-tailed)

" . " is printed if a coefficient cannot be computed

Table D.19: Descriptive statistics and Correlations of Variables for School 20.

Variable	Cases	Mean	Std Dev	-- Correlation Coefficients --							
				TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	15	4.1917	.4352	1.0000	.4280	-.3428	-.0595	-.0210	-.4667*	-.3869	-.4857*
CE	15	3.9167	.5951	.4280	1.0000	.2060	.2447	.0767	.1278	.1178	.1234
CC	15	3.9124	.3883	-.3428	.2060	1.0000	.6260**	.6648**	.7664**	.7202**	.7284**
COLLEG	15	4.7333	.3331	-.0595	.2447	.6260**	1.0000	.4844*	.1142	.0817	.1293
GOALS	15	3.6000	.6198	-.0210	.0767	.6648**	.4844*	1.0000	.1429	.1732	.1042
WORK	15	3.1167	.7827	-.4667*	.1278	.7664**	.1142	.1429	1.0000	.9329**	.9560**
FORMAL	15	3.0333	.7432	-.3869	.1178	.7202**	.0817	.1732	.9329**	1.0000	.7862**
INFORMAL	15	3.2000	.9122	-.4857*	.1234	.7284**	.1293	.1042	.9560**	.7862**	1.0000

\* - Signif. LE .05      \*\* - Signif. LE .01      (1-tailed)

" ." is printed if a coefficient cannot be computed

Table D.20: Descriptive statistics and Correlations of Variables for School 21.

Variable	Cases	Mean	Std Dev
TE	14	4.1339	.5852
CE	14	4.1276	.5460
CC	14	4.0119	.7085
COLLEG	14	4.7357	.8335
GOALS	14	4.1310	.9109
WORK	14	3.0179	.6465
FORMAL	14	2.8571	.5860
INFORMAL	14	3.1786	1.0443

- - Correlation Coefficients - -

	TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	1.0000	.3497	-.0940	-.2530	-.0565	.1584	.1162	.1309
CE	.3497	1.0000	.3288	.3257	.2451	.2971	.5732*	.0461
CC	-.0940	.3288	1.0000	.9408**	.9302**	.7885**	.4734*	.7105**
COLLEG	-.2530	.3257	.9408**	1.0000	.8545**	.5787*	.3459	.5223*
GOALS	-.0565	.2451	.9302**	.8545**	1.0000	.6243**	.3680	.5665*
WORK	.1584	.2971	.7885**	.5787*	.6243**	1.0000	.6101*	.8957**
FORMAL	.1162	.5732*	.4734*	.3459	.3680	.6101*	1.0000	.1941
INFORMAL	.1309	.0461	.7105**	.5223*	.5665*	.8957**	.1941	1.0000

\* - Signif. LE .05      \*\* - Signif. LE .01      (1-tailed)

" . " is printed if a coefficient cannot be computed

Table D.21: Descriptive statistics and Correlations of Variables for School 23.

Variable	Cases	Mean	Std Dev
TE	41	4.1616	.8160
CE	41	4.1546	.8071
CC	41	4.0903	.5665
COLLEG	41	4.8549	.6941
GOALS	41	4.2520	.8605
WORK	41	3.0475	.6993
FORMAL	41	2.5000	.7500
INFORMAL	41	3.5976	.9567

- - Correlation Coefficients - -

	TE	CE	CC	COLLEG	GOALS	WORK	FORMAL	INFORMAL
TE	1.0000	.6424**	.1568	.1053	-.0164	.0556	.0013	.0694
CE	.6424**	1.0000	.2185	.0851	.1021	.1192	-.0640	.2134
CC	.1568	.2185	1.0000	.8683**	.7719**	.6562**	.4301**	.6225**
COLLEG	.1053	.0851	.8683**	1.0000	.6272**	.2924*	.0925	.3546*
GOALS	-.0164	.1021	.7719**	.6272**	1.0000	.2945*	.2954*	.2047
WORK	.0556	.1192	.6562**	.2924*	.2945*	1.0000	.7633**	.8657**
FORMAL	.0013	-.0640	.4301**	.0925	.2954*	.7633**	1.0000	.3375*
INFORMAL	.0694	.2134	.6225**	.3546*	.2047	.8657**	.3375*	1.0000

\* - Signif. LE .05      \*\* - Signif. LE .01      (1-tailed)

" . " is printed if a coefficient cannot be computed

**Appendix E: Means and Correlations**  
**Between Informal and Formal Work and Collegiality,**  
**Shared Goals, Teacher Efficacy, and Collective Efficacy, Teacher-level**  
**and Within Schools.**

Table E.1: Means and Correlations Between Informal and Formal Work and Collegiality, and Shared Goals Within Schools.

Correlations Between							
	n	Formal Work M	Informal Work M	Formal Work /Collegiality	Informal Work /Collegiality	Formal Work /Shared Goals	Informal Work /Shared Goals
School 1	29	2.76	3.00	.43**	.22	.37*	.16
School 2	34	2.84	3.70	.18	.13	.20	.19
School 3	34	2.57	3.17	.40*	.39*	.44**	.54**
School 4	20	2.74	3.24	.46*	.35	.51*	.33
School 5	14	2.25	2.75	.07	.41	.29	.36
School 6	14	3.15	3.73	.59*	.23	.69**	.27
School 7	12	2.63	3.42	.54*	.63*	.65*	.54*
School 8	19	2.64	2.81	.29	.15	.43*	.12
School 9	19	2.68	3.38	.25	.14	.19	.13
School 10	14	2.02	2.43	.19	.53*	.55*	.80**
School 11	19	3.82	3.71	.37	.53*	.47*	.58**
School 12	22	2.3	3.28	.20	.67**	.12	.50**
School 14	20	2.51	2.88	.25	.61**	.13	.65**
School 15	5	2.52	3.15	.79	.92*	.88*	.95*
School 15	5	2.52	3.15	.79	.92*	.88*	.95**
School 16	3	2.92	4.08	.99*(-)	0	.43	.87
School 17	11	2.25	2.75	.58*	.71**	.23	.53*
School 18	11	2.86	3.07	.09(-)	.14	.66*(-)	.46(-)
School 19	13	2.40	2.79	.71**	.60*	.64**	.47
School 20	15	3.03	3.20	.08	.13	.17	.10
School 21	14	2.86	3.18	.35	.52*	.37	.57*
School 23	41	2.50	3.60	.09	.35*	.30*	.21

Table E.2: Means and Correlations Between Informal and Formal Work and Collective Efficacy and Teacher Efficacy Within Schools

Correlations Between							
	n	Formal Work M	Informal Work M	Formal Work/ Collective Efficacy	Informal Work/ Collective Efficacy	Formal Work/ Teacher Efficacy	Informal Work /Teacher Efficacy
School 1	29	2.76	3.00	.13	.16	.11(-)	.11(-)
School 2	34	2.84	3.70	.11	.04	.14	.09(-)
School 3	34	2.57	3.17	.32*	.16	.23	0
School 4	20	2.74	3.24	.35(-)	.16(-)	.11(-)	.01
School 5	14	2.25	2.75	.23	.36	.01(-)	.03
School 6	14	3.15	3.73	.18	.04	.06	.09(-)
School 7	12	2.63	3.42	.57*	.25	.62*	.56*
School 8	19	2.64	2.81	.46*	.48*	.23	.29
School 9	19	2.68	3.38	.01(-)	.27(-)	.35	.15
School 10	14	2.02	2.43	.42	.47*	.09	.11
School 11	19	3.82	3.71	.40	.33	.28	.11
School 12	22	2.30	3.28	.01(-)	.30	.30(-)	.17
School 14	20	2.51	2.88	.05	.45*	.22	.36
School 15	5	2.52	3.15	.36(-)	.	.	.
School 15	5	2.52	3.15	.36(-)	.18(-)	.53	.55
School 16	3	2.92	4.08	.95	.24	.08(-)	1 .00**
School 17	11	2.25	2.75	.26	.32	.49	.27
School 18	11	2.86	3.07	.48	.21(-)	.45	.28
School 19	13	2.40	2.79	.23	.03	.12(-)	.01
School 20	15	3.03	3.20	.12	.12	.39(-)	.49*(-)
School 21	14	2.86	3.18	.57*	.05	.12	.13
School 23	41	2.50	3.60	.06(-)	.21	0	.06

\*\*p < .05. \*\* p < .01. "." if no correlation can be computed.

## BIOGRAPHY OF THE AUTHOR

Sarah (Sally) V. Mackenzie was born in Presque Isle, Maine. She attended Scarborough (Maine) High School and graduated from Colby College in 1970 with a Classics-English major. She received a Master's in Library Science degree from the University of North Carolina at Chapel Hill in 1977 and a Master's in Education (Educational Leadership) degree from the University of Southern Maine in 1993.

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