PUBLIC SCHOOL TEACHER USE OF INSTRUCTIONAL TECHNOLOGY FROM AN ORGANIZATIONAL CULTURE PERSPECTIVE: AN EXPLANATORY CASE STUDY OF TWO MIDDLE SCHOOLS

By
BRUCE ALAN SPITZER

Bachelor of Arts
McPherson College
McPherson, Kansas
1984

Master of Arts
Fort Hays State University
Hays, Kansas
1993

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF EDUCATION
May 2004

PUBLIC SCHOOL TEACHER USE OF

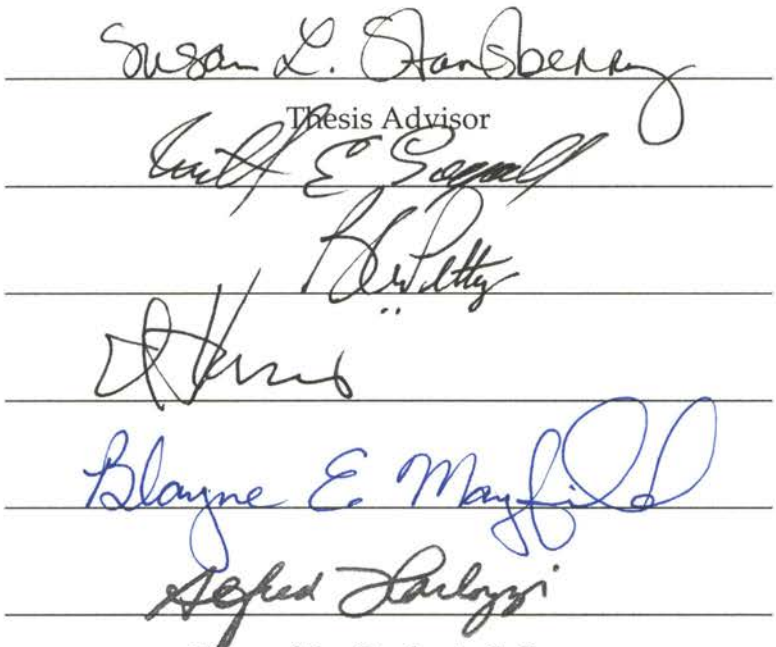
INSTRUCTIONAL TECHNOLOGY FROM AN

ORGANIZATIONAL CULTURE PERSPECTIVE:

AN EXPLANATORY CASE STUDY OF

TWO MIDDLE SCHOOLS

Thesis Approved:



Thesis Advisor

Dean of the Graduate College

ACKNOWLEDGMENTS

At the conclusion of a process as long as the dissertation requires, there is hardly enough room to thank all those who have touched me in some way throughout the journey.

To Dr. Susan Stansberry: thanks for your encouragement, for making time in your busy schedule to point me in the right directions when I needed pointing, and for always finding a way to include me in your work.

To Dr. Bruce Petty, who, on that fateful morning in the fall of 2002, needed a graduate teaching assistant "starting tomorrow:" I was glad to fill that spot. You've been the best. I will wear the title of "Junior" with pride.

To the other members of my committee, Dr. William Segall, Dr. Edward Harris, and Dr. Blayne Mayfield: thanks for your kind words and willingness to serve on yet another dissertation committee.

To the other members of the faculty and the staff of the Oklahoma State University College of Education: my heartfelt thanks for embracing me as student and a friend.

There are countless friends and fellow graduate students who also been a very important part of this process. While I am certain to forget to name someone

. . . to Mark Malaby, Cathy Orsack, Sharon Brown, Sibongile Mtshali-Dlamini, Mimi Ward, Juliana Utley, Sarah Ramsey, Jackie Bach, and Scott Harris: you have been the support network without which we would never survive.

Two friends are especially dear to my heart. To Dr. Gina Anderson: many, many thanks your daily words of encouragement and conversations about scholarly and not-so-scholarly issues. To Rhonda Danuser: thanks for countless cups of coffee and being a constant source of inspiration.

A special thanks to Mary Lou Paxton who listened and read and read and listened. You are a trooper.

And lastly, to my wife Gail: you have given me time away from home when I needed to be in the library or in the schools or at the office; you have put up with piles of books and papers all over the house; and you have managed to do so much with so little over the past two years without ever complaining. Without you, Gail, this would never have happened. I love you.

DEDICATION

This work is dedicated to my grandmother and my mother for the untold sacrifices they made in raising their four boys.

Emma Luella Yoder

1914-1996

Delores Jane Spitzer

1932-1997

TABLE OF CONTENTS

LIST OF TABLES

Table Page

LIST OF FIGURES

Figure Page

CHAPTER I

INTRODUCTION

Mrs. Richmond's advanced anatomy and physiology class is beginning a week-long project studying the muscles and organs of various specimens. The final goal of the week is for each group to have learned each of the 50+ organs and muscles for their assigned specimen and developed an online resource to share their knowledge with others in class. Mrs. Richmond's classroom is not like other classrooms at Sumner High School: in additon to the usual science tables and cabinets of equipment for dissection, there are six computer stations located throughout the room and one very special cabinet that contains several pieces of instructional technology equipment.

Students begin the project by suiting up (rubber aprons, latex gloves, and protective eyeglasses) and bringing out their specimens (cats, sheep fetuses, pigs, and frogs). After they have matched the specimen's organs and muscle tissues to their workbooks, they break out the digital cameras and start photographing specific parts of the specimen. One group worries about how they will actually

make the web page, but a student in the group assures them that web design is not very difficult. In another group, two students are concerned that they may not be able to remember all they are looking at and get out the necessary equipment to make a videotape of their specimen, pointing out the organs and muscles as they narrate the video for later study. Other groups are working diligently at getting good shots to put in their webpage.

It quickly becomes evident that Mrs. Richmond is not just a biology teacher but a technology-using biology teacher. She moves smoothly between anatomy questions and technology problems. She offers advice on how to take photographs of a specimen while at the same time pointing out the differences between various muscle groups. Across the room, one group of students encourages a member who has never used a digital camera to try her hand and she quickly picks up the process.

Soon, students have packed up the specimens and moved to the computers. Technology-comfortable students now take the lead and help others in the group with the design and creation of the group's website. Pictures are imported, decisions are made about good pictures and not so good pictures, and students are genuinely using technology in a meaningful way: as a process of discovery and learning. Mrs. Richmond's students have not asked about "why" they are creating websites; they know that these sites will be posted online for

themselves and future classes to use as study guides for virtual dissections. Mrs. Richmond's students are not just advanced anatomy and physiology students; they are engaged learners working in a technology-rich classroom where technology is used in ways that truly foster learning.

The "classroom of the future", a technology-based classroom, is quickly becoming the classroom of today, and this high-tech environment is now more the norm than the exception. Yet, while the technology-enhanced classroom described above can be found in some schools, it is an unfortunate reality that other schools lag behind in the development of technology-rich instruction wherein teachers use all the information technology tools available to them.

In fact, "from a student's perspective, going into a school today is, in many ways, like going into a time machine backwards" (Burrus, 2002b). Teachers have electronic mail, chat, and Internet protocol-based videoconferencing (Burrus, 2002a), but many are not using it in an effort to improve teaching and learning. Streaming media provides video clips on demand, but teachers do not have time to locate clips that relate to their teaching. Online course management software such as Blackboard and WebCT provide teachers simple tools necessary to develop, deploy, and grade online homework, quizzes, and exams, and support both synchronous and asynchronous class discussion, but teachers lack incentives and rewards to migrate their content to these platforms. Wireless

networks in schools allow students using laptop computers equipped with wireless technology to remain connected to a school network and collaborate with instructors throughout the school day and across the school campus, but network security fears keep schools from opening their networks to many users. The classroom of the future has arrived only to find that those expecting its arrival are ill prepared for its coming or too busy to embrace its arrival.

According to Regan (2002), in an online commentary entitled *Net Savvy Students to Teachers: You Just Don't Get It!*, "78% of middle and high school students use the Internet (probably a conservative figure), and that 94% of that number had used the Internet as a major research source for a recent major school project." Regan (2002) goes on to claim that a new report by Pew Internet and American Life Project found that the "most Internet-savvy among them [students] complain that their teachers don't use the Internet in class or create assignments that exploit great Web material." He adds, "The students said they wanted to use the Internet for more of their schoolwork, but teachers too often lacked the imagination to use it for anything other than mundane tasks."

Regan's message is clear: there were high expectations that the technologically enhanced classroom would revolutionize teaching and learning and the tools needed to do that are now readily available. However, teachers lack an ability to understand and use technology as a real learning tool and tend to

assign students technology-based work that is not meaningful. In fact, many students are better able to use technology tools than their teachers. The mass transformation of public schools expected by increased integration of technology has not occurred. In the public school setting, large numbers of students complain that their teachers are not instructional technology-literate in that teachers do not use instructional technology to its fullest capabilities in class or in assigning work (Regan, 2002). Teachers, like it or not, must adopt (or at least adapt) or they are doomed to fail to reach more and more of their students.

Statement of the Problem

Public schools have increased the amount of technology available to teachers, assisted in increasing teachers' familiarity with technology through training, and supported and encouraged the use of technology through administrative directives. In spite of these efforts to increase the use of instructional technology, public school teachers are not using instructional technology to create the anywhere, anytime classroom that was anticipated.

While schools tend to make instructional technology resources available to all who seek them, many teachers refuse instructional technology for a variety of reasons. Rogers (2000) indicates that barriers to instructional technology adoption and integration are found in both internal and external sources:

> Internal barriers may be summarized as "teacher attitude" and "perceptions" about a technology, in addition to a person's actual competency level with any technology. External sources include the availability and accessibility of necessary hardware and software, the presence of technical personnel and institutional support, and a program for staff development and skill building. Barriers that cross internal and external sources are lack of time and funding and the unique culture of the institution. (p. 459)

Rogers (2000) and Chiero (1997) summarize several studies of teacher barriers to instructional technology adoption and point out that different studies discover similar barriers. Internal barriers (barriers imposed by the teacher) include lack of time (both personal and release) to learn to use instructional technology and integrate instructional technology, lack of role models (others in the school site using instructional technology), lack of other models for using instructional technology, and teachers' attitudes about instructional technology. Rogers (2000) and Chiero (1997) also summarize external barriers (barriers teachers view as imposed upon them) as lack of availability and quality of hardware and software, lack of time, low levels of funding, low institutional support, minimal staff development, uncertainty that instructional technology affects student learning, and lack of technology support.

In addition to the question of adoption and integration, instructional technology represents a change in the way teachers and school officials operate. Change is always difficult and change in schools often seems even more difficult than in other areas. Gruenert (2000) determined that the culture of the school itself is one major factor in promoting change within schools:

> If things do not change it is because the existing culture did not allow it. Understanding what culture is and what it does allows leaders to orchestrate real change. Shaping school culture is not for the timid (Peterson & Deal, 1998) and it takes a long time, five to seven years. (p. 17)

The adoption and integration of instructional technology is a fundamental change in school culture and the education community. Cohen (1987) comments upon change, technology, and schools:

> Americans have celebrated technology as a powerful force for change nearly everywhere in social life. . . . Computers are only the latest in a long line of mythologized machines, endowed with near-miraculous powers. . . . Americans are fond of picturing technology as a liberating force . . . . Nearly all of the new technologies pressed on schools, from books to microcomputers, also have been advertised as agents of liberation. They would change education by making students less dependent upon

> teachers, and by reducing whole class, lock-step, batch-processed teaching and learning. (p. 154)

Teachers may be reluctant to embrace the change Cohen comments upon simply because they have found other changes in the past to be a false-cure for that which ails public education. If, in the past, teachers were quick to adopt innovative changes only to find that the innovations did not solve day-to-day problems, why then should teachers quickly adopt more innovations? For many teachers, it is much easier to address known problems through known solutions. Unfortunately, school cultures that do not promote change erect external barriers to teachers' adoption of innovations such as the integration of instructional technology in the classroom.

Another important facet of the problem exhibits itself in public school education: with school budgets straining under the weight of wide-scale budget cuts and decreased state funding, instructional technology can provide some relief by allowing teachers new, less costly ways of communicating with students and patrons. Yet, teachers cling to older, less efficient, more expensive communication tools. Add to that the ever-increasing emphasis placed on high-stakes testing as mandated by the federal government's *Leave No Child Behind Act*, and instructional technology quickly loses its place among school priorities. Teachers appear reluctant to embrace change.

Moursund (1997) has studied computers in education and has applied decades of personal involvement in computing and the field of education. While he has been an advocate of education reform and continues to believe that technology will have a positive effect on education, his views are tempered by experience:

> In retrospect, it is clear that I have been overly optimistic. Educational systems are quite resistant to change. Progress has not occurred as fast as I had thought it would. Still, considerable progress has occurred, and the groundwork has been laid for further progress. It is clear to me that we are just at the beginning of a number of major changes in our educational system that will occur because of continuing progress in information technology. (Morsund, 1997, Preface)

Dexter, Anderson, and Becker (1999) studied teachers' use of computers and studied whether or not computers were an impetus for change. They determined that teachers used computers to facilitate change, but that computers did not cause change. Rather, teachers cited experiential reflection, continuing education, and school culture as the driving force for change. However, not all teachers see instructional technology as a positive change. Goodson and Mangan (1995) found that social studies teachers saw computer instruction as detracting from pure content instruction.

Why then do a small number of teachers embrace change and demonstrate high-level competence and integration of instructional technology while other teachers adamantly refuse to adopt or even experiment with technology? The answer lies in the culture of the school site itself.

Purpose of the Study

The purpose of this qualitative case study is to examine the organizational culture of two specific school sites in which instructional technology use by teachers is evident; to study what and who influences individual teacher preferences toward instructional technology use; and to describe the relationship of Mary Douglas' (1982, 1989, 1992) grid and group typology in the decision process to implement instructional technology. Douglas' grid and group typology provides the theoretical framework for this study. Developed in 1982, the typology has been used to study, decipher, and compare various social contexts in educational settings. Harris (1995) established that the typology is useable when applied to selected educational contexts. Stansberry (2001) applied Douglas' typology to the study of faculty instructional technology preferences in higher education. While this study is modeled after the Stansberry study, this study will focus on teacher preferences in the middle school environment.

Research Questions

The following research questions are addressed in this study:

1. How is instructional technology used in classrooms in each of the selected schools?
2. In what ways does the use of instructional technology reflect grid/group realities in each of the selected schools?
3. What other realities were revealed in each of the selected schools?
4. Was grid/group helpful in understanding differences in teachers' instructional technology use in the selected schools?

Theoretical Framework

Douglas' typology is appropriate for use in studying the length and breadth of social settings. Harris (1995) found that "one of the model's most beneficial aspects is its holistic, comprehensive nature. It is designed to take into account the total social environment and individual member interrelationships among each other and their context" (p. 619).

Douglas' (1982) typology defines both the individual working within a socially constructed group (grid) and the group itself (group). In this study, the individual is the teacher working within the socially constructed group, the school site. Harris (1995) summarizes the grid and group dimensions: "Grid refers to the degree to which an individual's choices are constrained within a social system by imposed formal prescriptions such as role expectations, rules, and procedures" (p. 620). "Group represents the degree to which people value

collective relationships and are committed to a social unit larger than the individual" (Harris, 1995, p. 621). In short, grid measures the amount of autonomy an individual exercises within the socially constructed organization; group measures the amount which members of the organization value the organization itself.

Each of the dimensions is measured from low to high or strong to weak (Douglas, 1982). In a high grid or strong grid environment, there is "an explicit set of institutional classifications that regulate individual interactions and restrain their autonomy" (Harris, 1995, p. 620-21). In a strong grid school setting, teachers have little say in matters such as curriculum, pedagogy, and operations. In a low grid or weak grid environment, "there are few distinctions among members; individuals are esteemed more for their behavior or character than their ascribed role status" (Harris, 1995, p. 621). Teachers in a weak grid school have much personal control over their curriculum and teaching methodologies.

According to Harris (1995), in strong group settings "there are specific membership criteria, explicit pressures to consider group relationships, and the survival of the group becomes more important than the survival of individual members within it" (p. 622). Strong group schools value collaborative work among all members of the staff and work at creating a single, unified school site. In weak group settings, "pressure for group-focused activities and relationships

is relatively weak" (Harris, 1995, p. 622). Weak group schools do not encourage collaborative projects, and there is no evidence of teachers working together for the common good of the school site.

In a variety of ways, grid and group is useful in studying school culture and studying how teachers interact with that culture. Grid and group provides a framework within which individual teachers can be plotted on a scale of their "individuation" (Douglas, 1982, p. 190) and school sites can be plotted on a scale of their "social incorporation" (Douglas, 1982, p. 190).

Methodology

The participants in this study include selected teachers and administrators in two different K-12 school districts within the state of Oklahoma. These two school sites were selected by purposive sampling (Erlandson Harris, Skipper & Allen, 1993), chosen for their differing perceived organizational cultures and differing organizational contexts. Oklahoma State University College of Education faculty members who are knowledgeable of area schools were consulted in this process.

Approval from each school site was provided to the Oklahoma State University Institutional Review Board. Letters were mailed to the school site administrator requesting entry (see Appendix B) and included a copy of the Oklahoma State University Institutional Review Board application and a

signature-ready memo indicating permission to study the school site (see Appendix C).

All teachers at the selected school sites were invited to participate in an online survey designed to elicit information to assist in determining the grid and group make up of the school site. The survey instrument was developed out of the theoretical framework provided by Douglas (1982, 1989, 1992). The survey is a product of previous grid and group surveys and discussions with advisory committee members Dr. Ed Harris and Dr. Susan Stansberry, researchers who have studied grid and group typology. The survey consisted of 17 forced-choice statements (see Appendix D); respondents were required to select one statement of the pair which best describes their school site. Each pair of statements was designed to elicit teachers' perceptions of some aspect of their school site as it relates to grid and group typology. However, the language of grid and group was not used; the language for the statements was drawn from the vocabulary public school teachers would use in discussing their own social environment.

Following completion of the online survey, respondents were invited to participate in a face-to-face interview designed to gather more in-depth information about school culture and teacher use of instructional technology.

Following collection of the survey responses and interview volunteer information, appointments were scheduled at a mutually convenient time

between the interviewee and the researcher. All interviews took place in the interviewees' classroom or other location in their school site. Participants in the audio taped interviews were be given informed consent documentation (Appendix E) and given opportunity to review the document prior to signing. A copy of the research report was made available upon request by the subject; in addition, the location of the report if published in any journals will be provided to the interviewee. Participants were informed of their right to decline participation in any part of the study. Participation was not mandatory; any subject who chose to decline could do so freely. Anonymity was ensured using pseudonyms given to all participants involved in this study.

Rationale for Qualitative Study

The final decision on methodology and the data collection process is always based upon the research questions and the types of research to be conducted. In order to conduct a descriptive case study, triangulation of rich data sources is necessary to inform the questions of how and why instructional technology is being used as it is. Therefore, employing both quantitative and qualitative data collection and analysis methods in a mixed method study is appropriate. It should be noted, though, that the methods will not be 'evenly' mixed. Quantitatively, the study seeks only responses from school site teachers, administrators, and instructional technology professionals to 17 forced-choice

pairs. These responses assist in determining where on Douglas' grid and group typology the school site falls. While this determination is vital (it informs the data collected through interviews, observations, and document analyses), it is only one part of the study and needs to be coupled with the rich, deep data from the qualitative inquiry. It is this qualitative data and the fact that the study seeks to come to an understanding of two schools sites and the use of instructional technology in those school sites that prompts the use of a case study methodology to guide the research. Survey instruments are but one of many data sources available to the case study researcher, and the use of a survey to collect large amounts of customary data is supported by Anderson (1998).

Mertens (1998) cites Stake, Yin, and the U.S. General Accounting Office when establishing a definition of case study research. She relies heavily on Stake in establishing that case study is defined not by methodology, but by the case under scrutiny. Mertens (1998) says "the commonality in the definitions seems to focus on a particular instance (object or case) and reaching an understanding within a complex context" (p. 166). This study seeks to do just that: come to an understanding of middle school teachers' use of instructional technology within the context of Douglas' grid and group typology. The conclusions drawn will aid in understanding school culture, instructional technology use, and the

perceptions and attitudes about instructional technology of teachers, administrators, and instructional technology staff members.

Mertens (1998) supports the use of case study research when "the focus is on diversity among, idiosyncrasies of, and unique qualities exhibited by individuals" (p. 163). In this study, interview questions and observations sought how teachers, administrators, and instructional technology staff members perceive instructional technology and instructional technology use in the school site; how they use technology in instructional applications; and their attitudes about instructional technology use, both positive and negative. Quantitative methodologies cannot get at the richness of information needed to understand fully these perceptions, uses, and attitudes. Only through close contact interviews and observations can these details emerge.

Additionally, Patton (2002) supports the use of case study when one of three conditions is present: the need to understand humanistic values, when no statistically valid and reliable instrument is available to measure what is being studied, or as an adjunct to a quantitative study. This final reason is precisely the case here: the brief survey instrument is only one tool used in determining where the school site falls on the grid/group typology, and it does not collect the rich data about the use of instructional technology needed to come to an

understanding of how the school site's typology affects instructional technology use within the school site.

Significance of the Study

This study of teacher use of instructional technology in a public school can be important for several reasons. First, Douglas' grid and group framework has not been used to date in a K-12 setting to explain the variations in preferences for instructional technology use and from a socio-cultural context perspective. It is therefore necessary to test this framework's usefulness in this setting to determine its theoretical significance for future case studies regarding teacher instructional technology use.

Second, according to Rogers (2000), teachers' attitudes about instructional technology and their attitudes about their school's support for instructional technology use are important factors in the decision to use or not use instructional technology. The need to describe why some teachers use instructional technology can only be served by exploration of the socio-cultural contexts within which preferences are defined and perceived.

Third, as schools continue to embrace instructional technology in all facets of their culture and practices, an understanding of teacher preferences for instructional technology use will be beneficial. Often, when schools consider a shift toward instructional technology, they focus on hardware and software

within a specific budget. These are necessary considerations, but they should not be seen as more important than a consideration of the teachers' cultural preferences for instructional technology use (Tierney & Damarin, 1998).

Finally, the research directly benefits the research participants. Each school and each participant will receive information regarding the outcome of the study and how the study applies to the organizational culture of the school site. With this information, teachers, staff members, and administrators will better understand the organizational culture of their school and be better prepared to operate within that culture.

Definition of Terms

Culture. A review by Kroeber and Kluckhohn (1952) cited over 150 definitions of culture from the literature. For the purposes of this study, *culture* is "the beliefs, traditions, habits, and values controlling the behavior of the majority of the people in a social/ethnic group" (Spafford, Pesce, & Grosser, 1998, p. 67). *Organizational culture* was defined by Schein (1992) in much the same way:

> A pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems. (p. 12).

Yet, Schien also notes that extremely large organizations rarely have one, individual culture, but that the organization's subgroups create cultures of their own. *School culture* is the beliefs, traditions, habits, and values which control the behavior of the majority of school participants: administrators, teachers, support staff, students, and parents when they are acting in their respective roles in relation to the school.

School site. Specifically, the particular, individual grouping within a school district including both the physical structure of the school building and the people associated with that grouping. It is important to note the depth of feeling most people associate with the physical structures of schools sites:

> The schoolhouse is a powerful symbol in American culture. From the little red schoolhouse to the shopping mall high school, its representation evokes strong feelings in almost everyone. Yet like any public building, the schoolhouse derives its meaning from what goes on inside. It stands for both the myths and the realities of American education. (Cutler, 1999, p. 320).

School district. The school district is a political and geographical term. Politically, the district is understood to be the local education authority with responsibility for oversight of the school buildings, curriculum, and personnel, and everyday workings of the education system. Geographically, the district is

the land area used to define which local education authority has control over and responsibility for educating a given population. Historically, Theobald (1999) indicates that local district schools were formed by state legislatures when those bodies dealt with the establishment of free public schooling.

Instructional technology. The Association for Educational Communications and Technology (1996) has defined instructional technology:

> A complex, integrated process involving people, procedures, ideas, devices, and organizations for analyzing problems, and devising, implementing, evaluating, and managing solutions to those problems, in situations in which learning is purposive and controlled. (1996, p. 3)

Within this definition, instructional technology is not a thing, an item, nor a piece of machinery to accomplish a task, but rather a process by which people apply knowledge about instruction, human learning, and available tools to creating and managing solutions to the problems which arise as part of the process of teaching and learning.

Middle school and *junior high.* Perlstein (1999) characterizes the middle school as a grouping comprised of grades 6, 7, and 8 wherein teachers and support staff members base decisions about teaching and school activities on the middle school concept. Romano and Georgiady (1997) described the fundamental middle school concept:

> An educational concept—a school program and organization designed to meet the needs and characteristics of students who were too old for elementary school programs and not yet ready for senior high school programs—a school "in the middle" or a middle school (p. 7).

Perlstein (1999) sets the grade level of junior high schools at 7, 8, and 9. Both school's historical foundation lies in the early part of the 20th Century when 7th, 8th, and 9th grade students were initially segregated in urban settings and junior high schools were charged with preparing these students to enter the workplace rather than for continued education at the high school level (Perlstein, 1999). Later, dissatisfaction with this paradigm led to the formation of the National Middle School Association that sought to re-establish an institution which would serve the unique needs of adolescent students (Perlstein, 1999).

For the purposes of this study and due to the fact that the selected school districts differ in their make up of schools sites, the term middle school will be used in reference to Maple Grove where there is a grouping specifically labeled Maple Grove Middle School and a group of teachers identifying themselves as part of that group; junior high school will be used in reference to Hillwood Junior High School and its group of teachers. It should also be noted that due to the difference in each school's make up, the study was limited to those teachers,

administrators, and support personnel who mainly interact with students in the 7th and 8th grades so as to provide some uniformity to the study.

Barriers to instructional technology implementation, external and internal. While some school districts excel at providing teachers with classrooms equipped with ample instructional technology resources, these same districts find that teachers are reticent to use all the tools at their disposal. These barriers to implementation are described by Rogers (2000):

> Internal barriers may be summarized as "teacher attitude" and "perceptions" about instructional technology, in addition to a person's actual competency level with any technology. External sources include the availability and accessibility of necessary hardware and software, the presence of technical personnel and institutional support, and a program for staff development and skill building. Barriers that cross internal and external sources are lack of time and funding and the unique culture of the institution. (p. 459)

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

To better understand the use of instructional technology by public school teachers and the organizational context within which instructional technology use occurs, this study is a case study of two public schools and the 7th and 8th grade teachers working within those schools. Specifically, the study seeks to understand the teachers' attitudes toward the use of instructional technology, and to use Douglas' grid and group typology (1982) as a framework for understanding their decisions to use or not use instructional technology. As such, the themes in this literature review will address instructional technology in general, its use by public school teachers, perceived benefits and drawbacks to instructional technology use in public schools, barriers to instructional technology implementation, and Douglas' (1982) grid and group typology and school culture as a theoretical framework for the study.

Instructional Technology

With the recent blossoming of computer use in schools, instructional technology has taken on a general definition equating it with the use of the personal computer in school classrooms. However, its origins and the foundation upon which instructional technology is based is much broader and deeper than the use of one tool in schools.

Saettler (1968) indicates that even millions of years ago, the first of humankind to make and use primitive tools were users of instructional technology when they taught their children to use the tools, instruction which could not have been accomplished without some type of demonstration and hands-on practice involving the tools themselves. In a more modern vein, Saettler (1968) cites the school museum as the basis for modern instructional technologies.

> School museums began the first systematic experiments in the preparation of exhibits for instructional purposes. As part of this approach, they developed some of the first instructional systems prototypes in which new content, methods, materials, and media were introduced in American education. (Saettler, 1968,p. 83)

At the turn of the century, the visual instruction movement, its beginnings deeply rooted in the abstract-concrete theoretical rationale of the late 1800s

(Saettler, 1990), was spurred by the invention of the stereoscope, a perfected process of photography, and the invention of the motion picture projector (Saettler, 1990). These items brought to students a variety of learning experiences different from the traditional lecture-based learning to which they were previously accustomed. A period of growth in the visual instruction movement occurred between the years 1918 and 1928; Saettler (1990) indicates the following events:

- university- and college-level course work in visual instruction for teachers,
- local and national visual instruction professional organizations emerged,
- visual instruction professional journals begin publication,
- research in visual instruction reported, and
- emergence of administrative departments of visual instruction organized in schools, colleges, universities, and state-level education units.

Following World War II and its accompanying emphasis on military training utilizing visual instruction (Saettler, 1990), the visual instruction movement experienced a decline in popularity. "By the early 1950s, audiovisual instruction has begun to be replaced by audiovisual communications. Emphasis began to shift from the "things" of the instructional situation to the complete

communications process involved in transmitting information from a source (a teacher) to a receiver (the learner)" (Saettler, 1990, p. 167).

In the early 1930s, J. L. Potter and E. B. Kurtz "tested the power of television as an instructional delivery system" (D. Barron, 1989, p. 28) in the state of Iowa. By 1952, the Federal Communications Commission had dedicated 242 television frequencies to the purpose of educational broadcast television (Levin & Hines, 2003). A shift occurred in the 1960s away from audiovisual instruction toward instructional technology and "the application of scientific principles, particularly theories of learning, in order to improve instruction" (Reiser, 1987, p. 19). At this same time, programmed instruction began its emergence with the majority of research in the area conducted between 1960 and 1970 (Saettler, 1990). Gagne, Wager, and Rojas (1981) described programmed instruction as leading to a variety of courseware for drill-and-practice sessions, tutorials, and simulations.

The 1970s witnessed the development of the personal microcomputer (PC) which led to the development of a number of productivity applications. The mainstreaming of word processing, spreadsheet, graphics, database, and communication software increased the productivity of teachers and students and caused schools to re-think the way they produced instructional materials for learners (Gillespie, 1998).

Becker and Ravitz (1999) found that in schools where both technical and social support for computer use was available, computers became a powerful catalyst for change in both curriculum and pedagogy. Computers are even changing the way elementary schools operate (Berg, Benz, Lasley, & Raisch, 1998). Papert (1980; , 1983) believed that children would use computers as an entry to discovering their personal knowledge and as a vehicle for intellectual inquiry. Computers and computing have become ubiquitous in all facets of society, from work to personal living to entertainment (Perelman, 1992). They, along with a wide variety of other informational technologies such as CD-ROMs and the World Wide Web will continue to influence the way teachers utilize instructional technology to perform the tasks of teaching.

Public School Teacher Use of Instructional Technology

In his 1997 State of the Union Address, President Bill Clinton said, "In our schools, every classroom in America must be connected to the information superhighway, with computers and good software, and well-trained teachers" (Schrum, 1999, p. 83). Seven years later, schools are working to meet that challenge, but even after the actions of education reform groups; the introduction of new instructional technology courses in teacher preparation programs in colleges and universities; and the efforts of countless classroom teachers, site

administrators, and boards of education, America's classrooms have gained only a small bit of ground toward meeting those three goals Clinton established.

Surveys examining instructional technology have reported both woeful findings and flashes of brilliance in teacher use of the tools available to them. In 1995, surveys by the now-closed Office of Technology Assessment (OTA) indicated teachers felt inadequately trained to use the instructional technology available to them (Office of Technology Assessment, 1995). Two years following the OTA study, the Corporation for Public Broadcasting (1997) re-examined the topic and found that a number of teachers had received some type of instructional technology training, but very few reported training on specific technologies involving multimedia or the Internet. Still, even with training, few teachers feel adequately prepared to integrate instructional technology into their daily lessons (National Center for Educational Statistics, 1999).

Conversely, a study of over 2,000 teachers by Becker (1999) found that 39% report having Internet access in their rooms and an additional 25-30% report some type of connectivity within the school building somewhere. Even more encouraging is Becker's (1999) finding that 68% of survey respondents use the Internet for information retrieval. Oddly, though, only 18% report posting information to the Internet and an even fewer number (16%) report using email to correspond with colleagues. How teachers use instructional technology is

important, for it is teachers who are responsible for and initiate change within the schools. Some (Collis, 1996) have described the teacher as the single factor affecting the success or failure of computers in the classroom.

To what extent are schools investing in instructional technology tools? Slowinski (2000) notes that since 1991, over $19 billion has been spent on the infrastructure for instructional technology by American public schools; in 1999 spending topped $5 billion; more than 90% of schools were connected to the Internet; and the ratio of students to computers dropped to 5.7:1 (1995's ratio was 10.8:1). Statistics reported by Kleiner and Farris (2002) indicate that Internet access is now in 99% of public schools and 87% of public school classrooms. Clearly, school districts are spending the money necessary to create an information technology infrastructure in which teachers should find the necessary tools to successfully integrate instructional technology into their classes.

Rather than concentrating on the statistical evidence of technology availability in schools, Barron, Kemker, Harmes, and Kalaydjian (2003) focused on teachers' instructional use of technology as prescribed by the National Educational Technology Standards for Students. Their large-scale survey (n=2,156) looked at one urban school district and found that about half of teachers were using instructional technology at least as a tool for classroom

communication. In other areas such as teacher productivity, teacher research, and problem-solving, smaller numbers reported using instructional technology. Smerdon, et al. (2000) used the National Center for Educational Statistics (NCES) Common Core of Data Public School Universe file and derived a sample of 2,019 full-time teachers from which the following uses of instructional technology appeared:

- 61% assigning work involving word processing or spreadsheet creation.
- 51% assigning work involving Internet research.
- 50% using technology in the classroom for practicing drills.
- 50% of respondents recall assigning work that focused on using technology to solve problems and analyze data.

While such large-scale studies indicate some use of instructional technology by teachers, there remains a disparity between the amount teachers are using instructional technology (approximately 40% of teachers indicate they incorporate instructional technology at the level of highly integrated, integrated, or modestly integrated (Hart, Allensworth, Lauen, & Gladden, 2002)) and the amount of instructional technology access indicated by the literature. The disparity may be a result of a lack of understanding of the benefits of instructional technology use, a fear of the drawbacks to integration, and/or a

feeling of barriers created or perceived by teachers that bar them from adoption and integration.

Benefits of Instructional Technology Use

The benefit of instructional technology use to teachers is an area treated lightly in the literature. Few studies exist which definitively outline specific benefits to teachers. Where mentioned, benefits are vague and supported by anecdotal evidence at best.

Pea (1985) indicated that technology may be approached from two differing perspectives: as a tool to amplify or improve the status quo (it is then done faster, stronger, better, easier) or as a tool to create a wholly new status quo. Girod and Cavanaugh (2001) illustrate this with the difference between an improved saddle which allowed horseback riders the ability to ride longer distances more comfortably (an amplifying technology) and the automobile (which utterly changed the way people thought about travel and achievable distance). They contend that instructional technology in school classrooms must be used as an agent of change, not an agent of amplification (Girod & Cavanaugh, 2001). Teachers must rethink their position on instructional technology in light of a number of benefits realized after technology has been integrated into the curriculum.

Barriers to Instructional Technology Use/Integration/Adoption

Why teachers do not use instructional technology has been the subject of a wide variety of studies. Rogers (2000) determined that barriers to instructional technology adoption fall into two categories: internal and external. Internal barriers are those which teachers impose upon themselves. Barriers in this category include attitudinal, perceptual, and competency barriers (Rogers, 2000). External barriers are those which are imposed upon teachers including access to hardware and software, technical support, institutional support, and availability of technical training (Rogers, 2000).

Studies examining internal or self-imposed barriers have found that some teachers simply refuse to integrate instructional technology as they believe time spent with technology draws away from instructional time (Giannelli, 1985; Hannafin & Savenye, 1993; Hope, 1997; Norton, McRobbie, & Cooper, 2000; Willis, 1993). O'Neill (1995) points out another source of attitudinal barriers is an "overall lack of vision and clarity of goals with regard to instructional technology's role in the school" (p. 11). Without an adequate instructional technology mission statement, teachers will naturally defend the status quo rather than adopt new methods. Another internal barrier is the perception that instructional technology integration requires a large commitment of time on the part of the teacher.

Studies have shown that teachers believe they lack the necessary time to properly integrate instructional technology (Collinson & Cook, 2001; Cummings, 1998; Gibson & Hart, 1997). In addition, according to the National Center for Education Statistics (Smerdon et al., 2000), lack of release time to prepare for instructional technology integration was reported by 82% of teachers responding the 1999 Fast Response Survey System. Also, 80% did not feel that there was adequate time within the given class hour for students to make use of computers, and 78% reported not having adequate numbers of computers available as reasons for not integrating instructional technology.

Teachers also believe they lack the necessary skills or training to use instructional technology in their teaching (Abdal-Haqq, 1995; Bradley & Russell, 1997; Chin & Hortin, 193; Gibson & Hart, 1997; Parker, 1996; Topp, 1996). For many teachers, the computer is not a tool which can be used to teach, but rather a curricular area with its own specially-trained teacher whose responsibility it is to teach computers as a subject. "Too many teachers think of computers as a subject, rather than thinking of computers as a tool to learn other subjects. . . . Teaching computers as a subject is like teaching a class on how to make a pencil" (Dolan, 1994, p. 16). Often, staff development efforts are thwarted due to one of several reasons: off-site training location, training irrelevant to classroom activities, lack of follow-up training, or inability to meet individual teacher's

needs in the training (Mouza, 2002). Little (1993) indicates that 'training' may not be the most effective way for teachers to get new teaching skills, as training does not adequately prepare them to integrate new methodologies into daily teaching. The school district in Bloomfield, CT, developed a four-stage approach to instructional technology professional development which succeeded in creating a more well-prepared teaching force. Their approach included 1) teacher buy-in, including providing each teacher with a personal laptop computer with which to practice new skills; 2) assessment, using the NetSchools instructional technology assessment to identify strengths, weakness, and perceptions; 3) training targeted to skill levels, allowing training to move at an appropriate pace and encouraging dialogue among peer participants; and 4) collaborative follow-up and support with team-based follow-up support and training on-demand begun in phase 3 (Crystal, 2001).

While internal attitudinal, perception, and competency barriers may affect an individual teacher's instructional technology adoption, external barriers have a tendency to affect larger groups of teachers. Rogers (2000) listed these as lack of availability and access to hardware and software, lack of technical and institutional support, and lack of training.

Studies previously cited have shown that schools have large numbers of computers available; however, O'Neil (1995) indicates that over half of existing

computers are of obsolete computing power. Rogers (2000) divides hardware and software barriers into three categories: access to hardware to run particular applications, availability of hardware to teachers, and quality of hardware and software. And, some schools are still struggling to implement first-generation hardware while watching new technologies pass them by (Solomon, 2002).

A lack of technical and institutional support is a second external barrier to instructional technology integration. This lack may range from basic technical services such as installation of hardware and software to troubleshooting individual problems with teachers' computers (Appalachia Educational Lab & Tennessee Education Association, 1991; Byers, 1996; Harvey & Purnell, 1995; Quality Education Data, 1995; Ray, 1991; Spotts & Bowman, 1993).

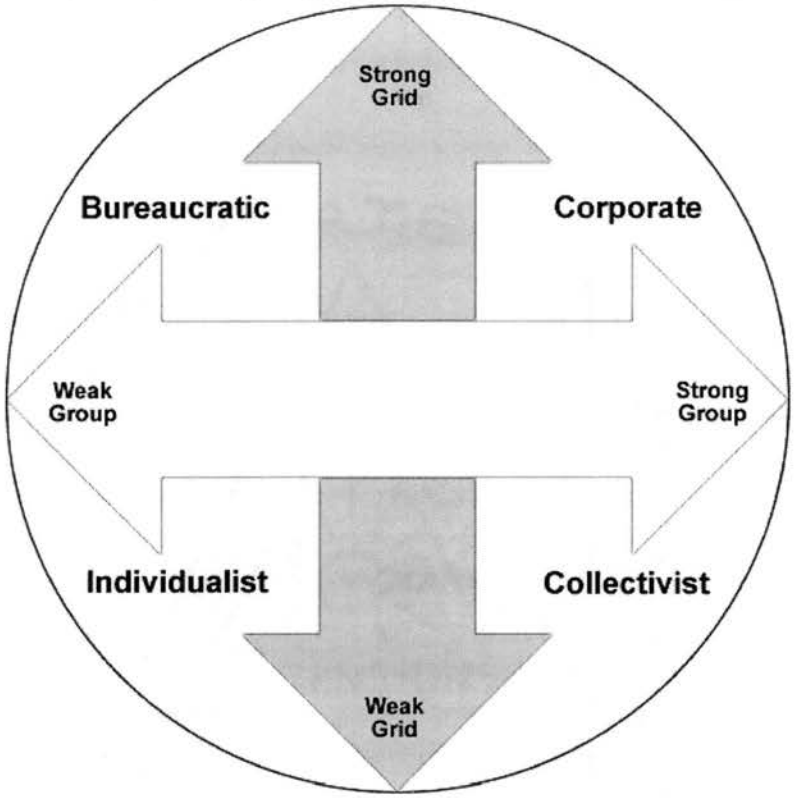
Mary Douglas' Cultural Theory of Grid and Group

This study is framed within the context of the cultural theories of British anthropologist Mary Douglas. Douglas's typology of grid-group was first outlined in *Natural Symbols* (Douglas, 1970). Douglas (1982) revised the typology and this later version became the basis for several other interpretations (Douglas, 1992; Gross & Rayner, 1985; Hampton, 1982; Thompson, 1982; Thompson & Wildavsky, 1991). Recent studies involving educational contexts have relied upon Douglas' 1982 version of the typology (Harris, 1995; Stansberry, 2001), and it is after the Stansberry study that this study is modeled.

Douglas began her research studying the culture of primitive African tribes, especially their religious beliefs and the social anthropology surrounding those beliefs (Hendry, 1999). The theory behind Douglas' work is grounded in the work of Emile Durkheim (1915); however, Douglas extended Durkheim's work in two fundamental ways: first, she allowed his theories of religion to cover all types of knowledge and all societies and their organizations (Hendry, 1999). "Whether in primitive or modern societies, the observed variations in religious practice and symbolism, belief systems, moral codes and classification schemes in general, including those underlying scientific knowledge, were all to be explained as consequences of social structure" (Hendry, 1999). Secondly, she replaced Durkheim's categories of sacred and profane and mechanical and organic solidarity with new categories of grid and group "based upon Bernstein's work on speech systems" (Hendry, 1999, p. 559) and applied these categories not to a society or an organization, but to individuals working and existing within those societies and organizations (Hendry, 1999, p. 559). Douglas' typology is represented in *Figure 1*

Figure 1

Mary Douglas' Typology of Social Environment Prototypes



The grid dimension. In the Douglas typology, the grid dimension is represented by the vertical axis and explores the limits of individuation or individual choice as proscribed by the organization's rules, roles, expectations, management, and procedures (Douglas, 1982). As a dimension of the typology, grid shows a progression in the amount of individuation (individual choice) from strong grid which equates to high limits on a individual's choices to weak grid or low limits to an individual's choices. In a strong grid environment, interactions between members of the organization are controlled by all manner of rules and roles. Positions within the organization are clearly defined and

maintained because strong grid organizations provide the frameworks which preserve them (Harris, 1995). "At the strong end of grid, individuals do not, as such, freely transact with one another. An explicit set of institutionalized classifications keeps them apart and regulates their interactions, restricting their options" (Douglas, 1982, p. 192).

In the weak grid environment, individuals are free to interact across the breadth of an organization without regard for position as no positions really exist. Class and other stratifications are removed; there are no expectations and no expected outcomes when individuals interact. Roles are not defined but are dynamic and shifting:

> Individuals, deciding to transact across them [boundaries], weaken the classifications. . . . The substantive signs of ascribed status are scrapped, one by one, and supplanted by abstract principles. . . . As individuals are supposed to transact more and more freely, the rules governing transactions may even multiply. Society turns into a veritable market, and for every new kind of deal, further external effects transform the social structure. (Douglas, 1982, p. 192).

The group dimension. The group dimension is the horizontal axis in *Figure 1* and represents the extent to which members of a group or organization will go to create, promote, and preserve a sense of group synergy. That is, to what extent

will individuals work to create and maintain a strong sense of group and to what extent will members of the group identify themselves as members of the group, both when operating within the group and outside the group. "The strongest effects of group are to be found where it incorporates a person with the rest by implicating them together in common residence, shared work, shared resources, recreation, and by exerting control over marriage and kinship" (Douglas, 1982, p. 202).

An organization which demonstrates strong group tendencies will have a strong sense of mission or purpose. Decisions will be group-made based upon what is best for the group as a whole. Members of the organization are held accountable to the group with an emphasis on group conformity. Members interact with each other both professionally and socially; member's lives revolve around membership in the group. Finally, there is a clearly defined set of members and a delineated set of membership requirements; individuals are either members or they are not members, but there is no gray area or confusion. Of utmost importance to the group is the continuation of the group over the welfare of individual members.

Weak group organizations demonstrate nearly a direct opposite make up. There is a lack of a group mission, or the group emphasizes individual promotion over the group. Because there is no mission, group decisions are not

made. Members are not accountable to other members of the group, nor is there an expectation of conformity. Members do not interact on a professional or social level. Membership in the group changes often as membership requirements are not clear. Members value self-survival over group existence.

The grid and group quadrants. The grid/group typology (Douglas, 1982; Stansberry, 2001) is a combination of the grid and group dimensions. The typology is made up of the four combinations of grid and group: weak grid/weak group (Individualist systems); strong grid/weak group (Bureaucratic systems); strong grid/strong group (Corporate systems); and weak grid/strong group (Collectivist systems). Each quadrant is described in *Table 1*.

Table I

Grid/Group Typology Definitions

Strong Grid/Weak Group BUREAUCRATIC	Strong Grid/Strong Group CORPORATE
• In extreme cases, no scope for personal transactions between group members. • Minimal personal autonomy. • Individual behavior is defined by roles without ambiguity and rewarded only for that role. • Group survival is not as important as individual promotion.	• Social experience of individual constrained by boundary maintained against outsiders • Individual's identity comes from group membership. • Individual's behavior dictated by the group. • Power structured in pyramid fashion with more power at the top. • Group survival and traditions are most important.
Weak Grid/Weak Group INDIVIDUALIST	Weak Grid/Strong Group COLLECTIVIST
• Social experience of individual not constrained by group rules or traditions. • Role status and rewards are competitive and based on merit. • Little distinction between individual role statuses. • Long-term group survival is not important.	• Individual's identity comes from group membership. • Individual behavior dictated by group. • Few formal roles – status is competitive, yet status roles are stable because of group influence. • Group survival is important.

Source: (Stansberry, 2001)

Outside of the field of anthropology, Douglas' grid and group typology has been used to study a number of situations. Caulkins (1999) used the typology in cross-cultural research; Mars and Nicod (1984) studied the career cultures of restaurant wait staff; Hendry (1999) focused on career expectations. Caulkins

(1999) considered high-tech firms while Schwarz and Thompson (1990) looked at instructional technology policy. In education, the typology has been used to study higher education (Lingenfelter, 1992), school culture (Harris, 1995), and instructional technology use in higher education (Stansberry, 2001). These last three will play an important role in the formation of the following case studies.

Summary

This Review of the Literature focused on determining the foundations of instructional technology use in public schools. That foundation is solid and its use over time well documented. However, despite instructional technology's widespread use, there is primarily anecdotal research that supports the declarations of benefits of instructional technology to student and teacher. More research in this area is necessary before definitive statements of benefit can be postulated. The research into teacher's barriers to instructional technology use, both internal barriers and external barriers, is well documented. The use of Douglas' (1982) typology is well-documented and has been used to study educational environments in the past. This indicates a credible use of the typology in studying instructional technology use in the middle school environment. This framework will provide the tools necessary to describe middle school teachers' uses of instructional technology.

CHAPTER III

METHODOLOGY

The purpose of this chapter is to provide details of the study methodology and the process used to gather, analyze, and report data. Qualitative research and the case study in particular was chosen based on the type of information to be reported: Stake (1995) suggests the use of case study to answer research questions or satisfy a need for general understanding.

Qualitative research "involves the studied use and collection of a variety of empirical materials . . . that describe routine and problematic moments and meanings in individuals' lives" (Denzin & Lincoln, 1994, p. 2). Qualitative research methodologies are appropriate for the development of these case studies which seek to describe and draw some conclusions from those types of situations in the schools chosen for the study. Through interviews, observations document analysis, and a short survey instrument, qualitative research practices lead to an understanding of the phenomenon under consideration.

The case study can best answer the research questions of this study. Stake (1995) explained that a well-developed case study "is distinguished by its emphasis on holistic treatment of phenomena" (p. 43). Developing an in-depth analysis of a phenomenon, specifically, the schools chosen for the study, is accomplished through a detailed description of those schools. The case study allows for that rich description.

There are three types of case study research: intrinsic case study, instrumental case study, and collective case study (Stake, 1995). Intrinsic case study is employed when the researcher has an intrinsic interest in a particular case; that is, the researcher is concerned with coming to a better understanding of a particular case. The researcher is not concerned about issues of generalizability nor with the case as an example of a particular problem or phenomenon. Rather, the research is undertaken because the researcher has an intrinsic interest in the particular case. Instrumental case study (Stake, 1995) is employed when the case becomes secondary to the issue of theory building or theory refinement. That is, the case is the instrument used to understand or further understand a theory or problem. Stake (1995) points out that the difference between intrinsic and instrumental case study is not sharply defined; rather, a gray area where the two combine for a specific purpose is what distinguishes one from another. Collective case study (Stake, 1995) is used when several cases are studied; it is not the

collected cases, but rather an instrumental study of several cases which may have similarities or not.

This study is a collective case study in that it uses two separate cases that share little in common with the exception that both cases are based in the same type of setting, a public middle school. However, the collective nature is accurate in that both cases are used to further understand culture and the relationship of school culture to teachers' use of instructional technology.

Data Collection Procedures

The schools in these cases were public middle schools located in rural communities in the lower Midwest. Stake (1995) indicates that selection of a typical case may be useful; however, since the nature of case study research is to learn much about one or two cases, even typical cases will not be strong representations of all others. Erlandson et al. (1993) advocates purposive sampling in selecting the site for a case study and guards against random and representative sampling:

> . . . the researcher's major concern is not to generalize the findings of the study to a broad population or universe but to maximize discovery of the heterogeneous patterns and problems that occur in the particular context under study" (p. 82).

Stake (1995) also suggests the pragmatic approach of selecting cases which are easily accessed and which are welcoming of the intrusion of the researcher into the site. Maple Grove Middle School and Hillwood Junior High School meet the practical criteria of accessibility and agreeability. Likewise, both exhibit use of instructional technology by teachers in the schools. Finally, they are unique one from the other in the demographics of the school, the financial resources, and the emphasis on hardware and software acquisition.

Initially, three school sites were selected in consultation with Dr. Susan Stansberry, whose study forms the model for this study, and Dr. Ed Harris, a faculty member at Oklahoma State University who is familiar with Douglas' grid/group typology. Both have studied schools in the area and were familiar with school sites enough to suggest schools that would, in all likelihood, reveal aspects of the typology and welcome research. In early May 2003, a packet containing information about the research project and lists of questions to be asked in the survey and during face-to-face interviews, along with a prepared letter of permission to be signed by the building principal, was mailed. Electronic mail messages were sent approximately two weeks later reminding the building principal of the mailing and requesting a response. These packets, letters, and emails went unanswered from May through early September 2003. In September, each of the schools contacted in May was again contacted by

telephone. Of the initial three packets sent, two schools declined interest ('we have been studied too much in the past' and 'we are not interested'); the third principal, Maple Grove Middle School's Chuck Randalia, requested a re-mailing of the packet and letter for his signature which was returned signed within one week. Entry to the second school site, Hillwood Junior High was accomplished via a telephone call by Dr. Susan Stansberry who was well acquainted with the personnel who could best grant entry to the site for research purposes. Following that initial telephone call, the school site was visited and the researcher met with the building principal and assistant principal who asked questions about the research and time commitment on the part of teachers. The researcher's role as observer-participant was also clarified for the principals. Following these explanations, the entry letter was signed. Once entry permission was granted by the building principals, Institutional Review Board permission was granted.

Questionnaire. Anderson (1998) supports the use of a survey instrument to collect large amounts of customary data. The survey instrument consisted of 17 forced-choice pairs of statements from which respondents were to select the one statement from each pair which best fit their school site. The information gathered by the questionnaire was used to inform the decision to classify the school site into one of the four typologies in Douglas grid/group typology. However, the survey and its responses was only one source for data to make that

decision. The questionnaire was developed using Stansberry's (2001) questions as a model but changing language from a higher education vocabulary (faculty member, college) to a public school vocabulary (teacher, school).

Approval was sought from each building principal to send an electronic mail message to each teacher meeting the criteria of middle school or junior high teacher. There were eight people at Maple Grove meeting these criteria; 22 at Hillwood met the criteria. In addition, building administrators and technology support personnel were also sent invitations to participate in the survey.

Survey respondents' invitations included a URL to a website where they read the following: "Your voluntary participation in this survey is greatly appreciated. Your identity will remain anonymous. The only information about you that will be collected is your school and your job function. Your completion of this questionnaire constitutes your informed consent to participate in this anonymous survey."

Respondents continued by indicating at which of the schools under study they were employed and indicating their position at the school as "classroom teacher", "technology support personnel", "school support personnel" or "administrator". Respondents then read the following instructions: "Below are 17 pairs of statements. For each pair, mark the statement that BEST represents your school site. Please remember to keep in mind your particular school site

(rather than your district as a whole) as you answer each question. Even though these statements may seem very 'administrative' in nature, please select one statement that best represents your perspective at your school site. It is important that one statement in each pair is selected." Respondents then selected one statement from each pair by clicking a radio button on the web page next to their choice.

At the bottom of the web page were a "Submit" button and a "Reset" button. No explanation for using these buttons was provided as they are common form buttons on web pages and an assumption was made that respondents would know to click "Submit" to proceed. Web-based survey results were submitted anonymously: no information specifying neither the respondent nor the computer used to complete the questionnaire was collected.

Results from the online survey were automatically stored in an electronic spreadsheet on the web server, and a copy of each respondent's selections was sent to the researcher's email inbox. The spreadsheet data was then analyzed in Microsoft Excel for frequency counts. Each groups' responses were analyzed separately; however, each was analyzed through the lens of Douglas' (1982) typology.

Respondents who wished to complete the survey but did not wish to do so online were provided a paper-based survey with the same informed consent

language. Subjects completing the paper-based survey were provided a self-addressed, stamped envelope with no identifying marks in which to return the survey. Participation in either the online questionnaire or paper-based questionnaire was not mandatory; any subject could choose freely to decline. No one at Hillwood or Maple Grove requested a paper survey.

Follow-up invitation email messages were sent approximately two and four weeks after the initial invitation. Printed invitations were placed in each teacher's school mailbox in early December. Four surveys were completed by personnel at Maple Grove Middle school, a total of 36% of the population of teachers, administrator, and support personnel. Eleven surveys were completed by teachers at Hillwood Junior High School amounting to a 50% response rate.

Interviews. Stake (1995) finds that qualitative researchers seek multiple realities when conducting case study research, and he goes on to say that interviews are the principal way to get to multiple realities. It was through extended interviews that the majority of data was collected for this study.

Following completion of the online survey, a second web page was displayed inviting respondents to take part in extended face-to-face interviews. If the respondent wished to participate, they were asked to provide their name, telephone, and electronic mail address. Like the online survey, respondents preferring the paper-based survey had the opportunity to indicate whether they

wished to participate in face-to-face, audiotaped interviews. A separate page of the paper-based questionnaire asked for the same information as those online (name, telephone number, and email address). A second self-addressed, stamped envelope was provided for return of this information so that it was sent separately from the survey information. Each person who volunteered to be interviewed was contacted and a mutually convenient interview time was arranged between the interviewee and the researcher. In all instances, the interview took place within the school site and in all but one instance in the teacher's classroom, the principals' office, or the support personnel's work area.

The interview questions were not highly structured; rather, they were open-ended, and the interviewer used them only as a starting point for delving into specifics as they arose during the interview. Stake (1995) recognizes that interviews are rarely identical for each interviewee; that each has varying experiences and differing stories to share. The purpose of the interviews was to gather information about the school's organizational culture and teacher and school site instructional technology use from the perspective of the interviewee. Open-ended questions allowed for this variety of information to come out.

Each interview began with questions about work history, worked through questions about experiences with instructional technology and ended with the open-ended question "anything else about instructional technology use at your

school you'd like to share?" Probing questions targeted specifics regarding the school site's organizational culture and the use of instructional technology within that culture. Each interview lasted between 30 and 60 minutes. In nearly every case, the interview was interrupted by either a student or other school personnel who needed information from the interviewee.

In all, 10 interviews were conducted, four at Maple Grove (33% of eligible respondents) and six at Hillwood (27%). Each interviewee was assigned a pseudonym, and all documents, observations, and interview information was recorded so that no identifying data was available.

Each interview was audiotaped following permission to do so by the interviewee. Interviews were transcribed by a third party transcriptionist and verified by the researcher. These documents were saved as plain text files and imported into QSR's *nVivo* qualitative research analysis software, version 7.0. The text files were coded using free coding and then grouped according to the themes that emerged.

Observation. The plan for observations is directed by the issues to be addressed by the case study (Stake, 1995). Stake (1995) also suggests that observations accurately recorded yield "incontestable description" (Stake, 1995); the researcher lets the physical surroundings tell the story. During visits to school sites for interview purposes, digital photos of teachers' classrooms, school

libraries, and other instructional technology facilities were taken and used as a data source when establishing a context within the case. Pictures were analyzed and notes taken about physical surroundings and instructional technology availability (Prosser, 1992).

Observations were also conducted on an informal basis. Following on-site interviews, field notes were dictated to audiotape and transcribed for later use. B. L. Berg (1998) advocates the immediate completion of field notes. Because interviews were scheduled at the interviewees' convenience, often there was little time for the researcher to record in writing observations and notes about the interview; dictating notes via audiotape allowed for immediate recording of fresh thoughts. Field notes were imported into QSR's *nVivo* software and included in data analysis.

Document Analysis. Data were also gathered from the school technology plans provided by each school's technology coordinator and the school websites. Stake (1995) encourages the use of documents as "substitutes for records of activity that the researcher could not observe directly" (p. 68). Each school's technology coordinator was asked to provide a copy of the school technology plan. These plans were converted to plain text files and coded in the same fashion as interview transcripts.

Data Analysis

In order to affirm that data collected throughout the study accurately depicted instructional technology use in the two school sites, triangulation of data was important. According to Erlandson et al. (1993), triangulation in naturalistic inquiry occurs when the researcher uses a variety of sources to look at the same event or phenomenon. In this study, both qualitative data in the form of interview transcripts, field notes, observation notes, and documents were compared alongside the quantitative data that the survey instrument revealed.

The researcher established a base of understanding of Douglas' (1982) grid and group typology by thoroughly reading extant literature on the subject. Included in the readings were Douglas' original writing on the subject, follow-up writings explaining Douglas' work, and studies of organizational cultures employing Douglas' typology. In addition, the researcher discussed grid and group typology with others who are interested in Douglas' work including academics and non-academics to arrive at a working knowledge of the vocabulary and application of the grid and group dimensions.

Following that background research, data was coded for its apparent usefulness in explaining each of the site's cultural make-up. In situations where the implication was ambiguous, discussions with Dr. Susan Stansberry yielded clarification of the issues in question. Analysis of the data was ongoing,

following Glaser and Strauss's (1967) constant comparative model, so that newly gathered data was compared to earlier data. The combination of constant comparison analysis with an emerging understanding of grid and group analysis allowed the researcher to dynamically construct portraits of the cases under study. Themes were recorded largely based on the cultural prototypes of the Douglas framework and included in the final analysis of the sites.

All documents related to the study were secured in electronic form and stored on a removable Zip drive; a back-up copy of the data including transcriptions, documents, field notes, spreadsheets, and *nVivo* databases were stored on the researcher's laptop computer.

CHAPTER IV

PRESENTATION OF THE CASES

The purpose of this case study was to study the organizational context of two school sites in which instructional technology use by teachers is evident; to study what and who influences individual teacher preferences toward instructional technology use; and to describe the relationship of Douglas' (1982; , 1989; , 1992) grid and group typology in the decision process to implement instructional technology use in curricula.

Stake (1995) indicates the need to tell a story to the reader: "for the reader's sake, for the cases' sake . . . the particular research situation's best story needs to be found. It is an effective author who tells what is needed and leaves the rest to the reader" (p. 121). Lingenfelter (1996) used a sports analogy in which the description of the case is built around the playing field (or physical resources), the players (people involved in the case), the rules of the game (relationships between and among players), and the game (activities as performed by the players). These two cases will follow Lingenfelter's (1996)

analogy with Stake's influence to tell the best possible story of the relationship of culture to teacher instructional technology use in the two schools sites studied.

Case One: Maple Grove Middle School

The Playing Field

> *"The space dimension of a social environment provides the playing field upon which people engage in meaningful social action. It is essential to understand the component of that social space to know how people classify and define that space and to understand the significance of space in terms of meaningful action. (Lingenfelter, 1996, p. 36)*

Situated in a rural setting on the edge of a small town, the newness of the Maple Grove School building is as apparent as is the whiteness of new athletic shoes worn for the first time. Not only is the building new, it is a striking contrast to the dilapidation of the homes that make up the town of Maple Grove. A tour through the town yields virtually no commerce or industry; houses are in disrepair; and abandoned vehicles are left where they were last parked whether that be on the street, in the driveway, or on the front lawn. Boarded up storefronts occupy most of what was the downtown. There are few cars to be seen driving in the town and even fewer people walking around.

But at the east edge of town is a fine brick school complex with a bright blue roof. Locals refer to it as the 'shopping mall on the prairie.' This building is

relatively new, built in 1989. It is surrounded by chain link fence with a lockable gate at the front entrance. The parking lots are paved; the cars range from the newest SUV to those that look as if they themselves might join the others abandoned around town.

Maple Grove is a single site school district: all of the district's administration, teaching staff, and support services are housed in a single building. The building has obvious divisions for elementary, middle school, and high school areas, but all are easily accessible from each other. Students in grades kindergarten through 12 co-mingle, though Maple Grove is such a small district that there are never large groups of any one age. District wide, the census of 2000 found only 452 persons between the age of 0 and 18. What sets Maple Grove apart from most other districts in the state is its population of those who label themselves American Indians (National Center for Educational Statistics, 2003). The largest group in the district, 43.1% (195 of 452) of the population under 18 chose American Indian as their ethnicity. Only slightly smaller, 42.7% (193) chose White as their preferred race label. A very small minority of the population is African American: 0.9% or four individuals. There are 45 certificated staff members employed at Maple Grove. This includes teachers and administrators from kindergarten through grade 12. The middle school staff is overwhelmingly White, and most do not live within the district, as there is little acceptable

housing available.

Maple Grove has dedicated a large portion of its capital outlay over the past 10 years to creating and maintaining a technologically innovative learning environment. Much of the infrastructure was brought about through the efforts of the former superintendent. Robert Fayette was known as an administrator with expertise in securing grant funding and one who emphasized instructional technology use in the classroom. Marcia Readlyn, one of the district's technology support personnel described working at Maple Grove under Mr. Fayette:

> If you were a technology-using teacher and loved technology, this was the place to be. There wasn't a district anywhere that had anything newer, cooler, or, you know, more of . . . I don't say that to be boastful, it's just [the superintendent] emphasized it. He felt it was important, he didn't mind putting money into that, and so, if there was something new, whether it was a software program, or all the way up to new machines, that was an emphasis for him. So if you were one of those people that just liked to have that stuff, you wanted the digital cameras as soon as they came out, if you wanted the camcorder . . . when it came out, if you really wanted to get your hands on it, then this was the place to be.

Maple Grove has made a conscious effort to equip students with computers. Several years ago, a decision was made to put a laptop computer into

each student's hands. Each student in grades 7 through 12 was provided a new Macintosh laptop. Originally, the program gave each student total responsibility for the computer, and each student was allowed to take the computer home each evening. That changed, however, according to Chuck Randalia, Maple Grove Middle School principal.

> We allowed our students to take them home . . . with 7th and 8th graders their responsibility level is not always as high as it should be, so therefore, we suffered a lot of damages, so now we have kind of scaled that program back to where they can't take them home, but when they get here [the school] they check it out . . . and take it through the day with them and plug it back in and charge it back up for the next day. Now there are some students that we allow . . . on an individual basis, if they need that computer to do some work at home, they are allowed to take it home.

Now only students in grades 9 through 12 are allowed full control of their computer and are allowed to take it home overnight.

Throughout the school, students have access to computing technology. In the elementary grades, each classroom has six desktop computers and access to a 25-station computer lab. The 5th and 6th grade students are on a rotating schedule for access to the computer lab, mostly used for learning and improving

keyboarding skills. Most classrooms in the middle school have classroom sets of computers with wireless access to the network. These classroom sets of computers may be older computers that remain viable after they have been taken out of daily service being replaced by newer student computers. Both Macintoshes and IBM-compatible PCs are in use across the district. The high school and middle school students use Macintosh computers while the elementary uses mainly IBM-compatible PCs.

Maple Grove financed the purchase of much of the computer hardware through the passage of a bond issue. Mr. Randalia explains:

> [To finance] the computer purchasing program we did pass a bond issue two or three years ago. Our superintendent also included in that bond technology updates every three or four years so there was money there to update our computers whether it was programs or the computers themselves which is really going to help over the next, I believe it goes up for 10 more years. So, on top of the revenue that we already get, that's really going to create a good situation.

Throughout the complex, Maple Grove has deployed a wireless computer network available to any student or staff member with the hardware to access it. One of the most telling incidents about student access and computer use is told by Ms. Readlyn about students accessing the newly installed wireless network.

When we first put in the wireless network, kids that lived in homes where they either don't have a phone . . . or have phones that can dial into the school, but it's a modem, and if you've ever been used to high speed and you go to modem, you want to pull your hair out before the page loads, and so, when we first put in the wireless network and we have the kids with computers, it was not at all uncommon to come up after hours and the kids be in their cars in the parking lot, because you could get the signal in the parking lot, and they had their machines, and so, why sit at home where they either had to deal with a modem, or they just didn't have any access to Internet when they could just come up to the school. Now, were they sitting out here doing homework? Probably not, maybe so, but, I didn't care, I mean the fact that they were engaged and using it, that's awesome, because that's what it's about, it's about teaching them the skill to use it.

In addition to the computing and networking hardware available for student and teacher use, Maple Grove also has a sophisticated video production facility. This room, funded by grant dollars and created by a former technology support professional, includes high-end production equipment such as cameras and lighting, production studios with green screen chroma-key capability, editing equipment for both linear and non-linear video editing, sound

production equipment, and multiple videotape dubbing capabilities. Also in the video production room are computer workstations for teaching video production classes. While this facility may not see as much now use as it has in the past, the studios continue to be maintained and used on an occasional or case-by-case basis for student projects and coursework.

The video production studios are also the location of the district technology coordinators' workspaces. Hence, the room houses computer repair facilities, spare parts, obsolete equipment, a software library, and other periphery necessary to running the school's instructional technology.

The Players

> *The people who consider a particular playing field a legitimate place in which they spend meaningful time are the subject of our research. It is people who establish relationships with one another and engage in activities together. (Lingenfelter, 1996, p. 36-37)*

Central administration at Maple Grove Schools. The central administration at Maple Grove Schools is housed in the same building complex as the school itself. Visitors are to check in at the superintendent's office where they sign a register and pick up a name badge identifying them as a visitor to the school. The researcher did find it odd that there is no 'gatekeeper' to the superintendent. In fact, when entering the superintendent's office suite, hers is the first office inside

the door. Other personnel are across the entry area.

The atmosphere at Maple Grove Schools is casual. While the registration form and name badges imply security and safety, after just two visits, no one questioned the researcher's signing in nor did anyone look at the researcher oddly as he walked the halls of the school.

Anne Waverly is Maple Grove's superintendent. She is newly hired in the position after Robert Fayette's departure last year. Teachers and staff members indicate that the new superintendent is certainly different from the previous administration. Susan Oran, middle school social science teacher, spoke of the difference between the two:

> Our previous superintendent was very into technology . . . and we have a new superintendent that, I'd rather say that's not her focus. But she's new to the system, so she's just learning the system, so I think it's fair to say that she's not pushed us toward technology like he had, but she's not made us shy away, either.

The environment has changed at Maple Grove, though, with the departure of Mr. Fayette and the hiring of Ms. Waverly. According to Ruth Frederic, an elementary staff member and new to the district in the fall of 2003, Ms. Waverly brings no teaching experience and no superintendence experience to the position. This lack of understanding and apparent knowledge of the needs

of teachers and other administrators appears to be causing some problems among personnel in the district. Others in the district are less willing to comment on the new superintendent withholding judgment until a later date.

The middle school administration. Chuck Randalia is Maple Grove's principal. He is primarily responsible for 8 middle school teachers and other staff members dedicated to the middle school. However, Maple Grove, being a small school, Mr. Randalia has other duties as well. His professional background includes years spent as both administrator and girl's basketball coach. He was brought to Maple Grove by the former superintendent, Robert Fayette.

Mr. Randalia is like many of the long-time teachers at Maple Grove. He's had to adapt to a new way of operating in a technology-oriented school system:

> I was one of those that, when we first started, that hadn't been exposed to a computer other than putting my basketball stats from my team on computer and that was about it. I didn't know what e-mail was when I first got here, so I've learned. I've learned a lot, and now I just couldn't, it's one of those things you can't and won't do without.

Mr. Randalia encourages his teachers to use instructional technology, but he won't force the issue. In the past, the teacher evaluation instrument included language specifically to evaluate use of instructional technology. But recent negotiations have removed that language from the instrument.

Teachers at Maple Grove Middle School. Aaron Westgate is Maple Grove Middle School's science teacher. He has been at Maple Grove since he began his teaching career 12 years ago. Westgate even did his student teaching at Maple Grove and was then hired as a full-time faculty member. By his own admission, Mr. Westgate was not a technology-using teacher when he first arrived at Maple Grove.

> When I came here (I did my student teaching here), I didn't know what a 3½ [floppy diskette] was, I didn't know how to save to a disk, I didn't know anything. And I told him [the cooperating teacher], pretend like I know nothing, which I didn't, teach me everything. He taught me everything. That's the only way I've ever taught. I've only taught with technology.

Today, however, Mr. Westgate is looked upon as one of the school's main instructional technology users. Mr. Westgate does not consider himself the resident expert, but he does fill the role of peer mentor and role model:

> I get a lot of questions . . . but, resident expert, no. I can answer most of what they ask, but then the other thing you have to keep in mind here is that we operate on two different platforms, we're on a Mac platform and we have a PC platform, so, as long as it's something cross platform, yeah, they come to me, then when it gets a little too specific, then we have two

people that can answer those questions.

Of the teachers specifically listed as middle school teachers, Mr. Randalia speaks of three teachers who use instructional technology more than the others, among them Mr. Westgate:

> You always have those on your staff that go up and beyond . . . and I'm very fortunate to have three teachers on staff that do a great job with the computers. Aaron Westgate, my science teacher, probably knows more about a computer than, I'm going to say, maybe even close to two technology directors. He does such a great job with it; we, the kids, everybody is excited to go science, they can't wait till they get to science because they're always doing something neat on the computer whether it's using the PowerPoint or just getting to work with the computer. Aaron puts all of his lessons on there, and everything's ready to go; they know how to run the computer, the information's there, they retrieve it, and the classroom just runs itself and Aaron just kind of oversees and makes sure everything's running smoothly.

Another technology-using teacher is Susan Oran, a social science teacher at Maple Grove Middle School. She does not claim the same level of expertise as Mr. Westgate, but admits to enjoying her position at Maple Grove and using the instructional technology tools available to her. Like Mr. Westgate, her

instructional technology training is a product of employment at Maple Grove. She cites both formal instructional technology training and informal training as the ways she gained her skills. Formal training has taken place at locations both in school and out-of-district:

> . . . different workshops, I went to a couple at the co-op in [a nearby town], the . . . inter-local co-op, I did a couple things there, but mainly learning from the technology director here. Of course we had Friday afternoons off, and that was our technology training on Friday afternoons and I learned through there, um, colleagues, Aaron [Westgate], he taught me stuff, and then just having the access to the equipment and being able to take it home and play with it, and learn how to use it, that's pretty much where I got my training.

Both Mr. Westgate and Ms. Oran cited the Friday afternoon training sessions as places they learned or improved their instructional technology skills. Those workshops will be discussed in greater detail in a later section.

Mr. Westgate spoke of teaching with instructional technology as the only way he had ever taught. Ms. Oran recognizes that Maple Grove is a unique school with a variety of resources available that are not available in other places. She considered how her teaching might change if she were to leave Maple Grove:

> I keep thinking, why would I ever want to leave? I mean, other than the

drive, it's wonderful here, and again, we have so many wonderful resources and so many things available to us. I just think it would take a while to adapt to not being able to have computers whenever I want them. . . . but going to a different school just seems . . . I think I could do it, but it would be hard, just to think that I didn't have all this stuff, it would just be weird, I think , to have to go through that and learn that. And I know people come here and think, whoa, I never had this at my school or we never did this kind of thing . . . but I would have to adapt the way I did things and find other resources, other projects to do other than using the computer, and maybe that's a good thing, because my kids are so dependent on using the computers for projects. I've never had them make a poster of anything; we've always done it on the computer. That may be bad on my part, rather than do it on paper, paper assignments, I don't know...

Technology support personnel at Maple Grove. Maple Grove's technology directors are full-time employees whose jobs it is to manage the districts instructional technology resources including serving as resources for instructional technology integration suggestions, software and hardware acquisition, and technology repair. Marcia Readlyn is one of two technology directors. She characterizes her position as both hardware and software expert:

> . . . it's [job function] just grown in terms of the responsibility, but primarily my initial function was classroom integration of technology, working with the teachers and students on the software. Really, I'm not a network person, although that has changed as we've brought in the laptop program, because that necessitated servers and some networking things, but I was still not a network guru at all. My function is more the use of it, and so, that's a chunk of what I do.

In addition to serving as a resource person, Mrs. Readlyn also has trained the teachers at Maple Grove. In past school years, Maple Grove Schools met on a modified schedule that sent students home on Fridays at noon. This modified schedule allowed for teacher technology training every Friday afternoon. Mrs. Oran and Mr. Westgate both spoke of the benefits of these training sessions and their disappointment at abandoning the modified schedule. Mrs. Readlyn indicated her dismay as well:

> I think it [dropping the Friday afternoon training sessions] was a real setback, because those people that really wanted to learn something need more than just the once every semester in-service thing, and everybody recognizes that, so, in a way, I think it kind of was a blow to them. It provided a convenient excuse to say, "Oh well, I just don't know how to do it, I'm not going to . . ." I think it's caused a decline of use in the

classroom, and whether it's an excuse or whether it's legit, it just provides an avenue for teachers to say, "I don't know how, and now I don't have any way to get that training." For some that's frustrating because they like using it, and for some it's a good excuse; it's kind of mixed.

Students at Maple Grove Middle School. Student computer use at Maple Grove shows the breadth and depth of their knowledge. On multiple visits to the school, the researcher witnessed a variety of computer uses by students demonstrating different levels of computer expertise.

In Mr. Westgate's class, students used digital photography and QuickTime® Virtual Reality software to create movies of a variety of scientific functions. In addition to the process of creating them, Mr. Westgate's students are all knowledgeable of web site development procedures so that they can upload their movies to a server and link them to class web pages. On another visit, while meeting with one of the technology coordinators in the video production facility, a student worked unsupervised for approximately one hour on a video production project. In addition to computer video editing, the student used a digital video camera to capture the video and fire wire capabilities to download the computer to the computer on which he was working. These two uses indicated a high level of student trust with equipment that in other schools might only have been used under direct supervision of school personnel. During

that same visit, however, the researcher also witnessed a student with a computer problem that was easy to remedy (a problem with a software installation), but the student indicated that she had no idea how to address the problem and could she drop her laptop off that afternoon to have the software reinstalled. These examples indicate both a high level of computer use, knowledge, expertise, and a low level of confidence in computer skills.

Mrs. Oran addressed the differences in student computer knowledge especially when a student new to the Maple Grove district and, in all likelihood new to technology, joins her class:

> Whenever we get a new student, I'll always try to pair them with . . . I'll have them sit with somebody who's been on the computer, that knows what they're doing because then those kids are going to show the newer kids how to use the computer easier than I will. They can kind of relate to each other, where I'm going to show them the structured way to use it and the kids are going to use it in a more student friendly way.

Mrs. Oran knows that her students have the skills necessary to help other, non-computer-using students become successful users. It speaks highly of their skills as both technology users and as peer mentors.

The Rules of the Game

Every social environment has within it socially specified relationships. These

relationships may be defined in terms of social roles and/or a collective organization of a group. The definitions by which people order their relationships and engage in activities with one another constitute the rules of the game. (Lingenfelter, 1996, p. 38)

Former superintendent Robert Fayette was focused on Maple Grove Middle School teachers in using instructional technology. It was one of his pet projects and he worked diligently at making available instructional technology resources for each teacher and for each student. He believed in the power of instructional technology to help every student achieve what he or she is capable of achieving. One former district employee indicated that Mr. Fayette believed that no student should be on the same page as another student at the same time on the same day.

So strongly did he believe in the use of instructional technology in the classroom that the atmosphere around Maple Grove reflected its emphasis. Mrs. Readlyn spoke of the culture of instructional technology use at Maple Grove under Mr. Fayette's administration:

> If you really wanted to get your hands on it [technology], then this was the place to be. If you didn't like technology, I think it was probably a somewhat stressful place to be because it was really emphasized. The kids themselves would make it a little stressful, I think, on the teachers because

maybe last year they had Mr. So-and-so, and he used it. They used digital cameras and they made movies and they did all this stuff, and now we have Mr. So-and-so, and he doesn't use any of that and the kids want that. I find that to be a real thing, that the students will say, "Well, I can type this stuff, why do I have to write it? Can I make a PowerPoint of this?" And if the teacher isn't comfortable with that, I think they feel a little bit on the spot by that. Also from the administration standpoint, part of the teacher observation . . . evaluation had a little technology evaluation that asked, "Are you using this, this, and this and can your students use this, this, and this, and show me how you do this, and where's your class web page, and are you working on creating that?" So there were things that were required, and they varied depending on the grade level that people taught, but that was all part of their evaluation. I think if you were uncomfortable with that you, felt a lot of pressure to have to use technology even if you didn't like it. It was where the emphasis was.

A formal evaluation of teachers' use of instructional technology use is a fundamental indicator of the level of expectation in a number of ways: knowledge, use, integration, application, and creativity.

However, it is important to point out that teachers at Maple Grove are no longer evaluated formally on their instructional technology use. Mr. Randalia,

middle school principal, said that formal evaluation is no longer needed, as instructional technology use has become an expectation: it has become part of the culture of Maple Grove Middle School. The instructional technology portion of the instrument was in place for approximately two years, but was taken out. Mr. Randalia described his process of evaluating teachers as a classroom visit of 20 to 30 minutes, but also indicated that the instructional technology evaluation would be conducted over the entire year so that teachers could have the whole school year to accomplish the instructional technology goals set forth in the evaluation instrument. He also described faculty feelings about the instrument, saying that there was little or no resistance to instructional technology being part of the evaluation instrument because the instrument is a negotiated item and a committee comprised of faculty members helped create it.

Teachers at Maple Grove derive very few extrinsic benefits from instructional technology use in their classrooms. However, they do enjoy certain intrinsic rewards. Susan Oran has found extrinsic rewards in attending conferences and training sessions and in helping her fellow teachers:

> We can go to conferences and I've been to a few conferences. That, to me, not that it's actually a reward, but to go to different cities and go to the conferences there, and, of course, after the conferences you have time to do things in the evening. And that, to me is a reward, getting to go to

places, for utilizing it. And getting to help other people on their computer, that's a reward.

Aaron Westgate described Maple Grove as a rewarding situation in that he could not imagine asking for some type of hardware or software and not having the purchase approved. He even knew of purchases that to him seemed more than what was needed at Maple Grove:

> Anything that I can imagine, we either have it or we could probably get it....that's not being arrogant, that's just being truthful. If I wanted a white board, an $8000 white board, my principal would have it in here...overnight, if it passed, more than likely it would pass our board without any question. I'm not a fan of the white board, but as far as software and things like that go...I can't ask for anything else, I have more than I can use...and there's a probe system, science probes, it's in the high school, our last, crazy, psycho science teacher ordered, and he hasn't used it at all . . . he left, and he didn't use it at all! I just don't have time to sit down and figure out all this great stuff out . . . Ph probes, heart monitors, temperature, dissolved oxygens, carbon dioxide. With what I do, I haven't had time to sit down and check it all out.

The community of Maple Grove has also established itself as a part of the rules of the game. Maple Grove is situated on lands owned by a tribe of Native

Americans. Demographically, the student body reflects that geographic location in that just over 43% of the district population under that age of 18 listed American Indian as their ethnicity on the latest U. S. Census. The four administrators of Maple Grove Schools (elementary, middle school, and high school principals and the superintendent) are all Caucasians (two males, two females) and only one of five school board members is Native American. However, the community plays an important role in instructional technology use at Maple Grove. Because of his long-term association with Maple Grove as an administrator, Mr. Randalia has a feel for the community perception of instructional technology:

> You've got part of the community that knows where the future's headed and they know their children need to be exposed to computers and that's just the way it's going to be: they're going to see it in everyday use, and the older they get the worse it's going to become. I use the word worse . . . the more they're going to be using it. Whereas you've got the side of the community that says, "I want my kids to know, I want them to be able to read, I want them in the text book." Not everybody's going to be able to afford a computer. They can be exposed to too many things on the computer. . . . I'm going to say, overall the community supports it, but, I think the majority feel like that you can have too much. I think that's the

small section that we have here in our community . . .

While this characterization is of the community's attitudes towards instructional technology, Mr. Randalia indicates that such an attitude is indicative of the entire Maple Grove community at large in regards to other aspects:

> . . . parents here, most of them have lived here all their lives, they don't know anything other than Maple Grove, they don't know anything any better than Maple Grove. They expect their kids to have what they got, which isn't a whole lot, and it's really a shame, because the majority of them do feel that way: they don't want them moving off, they don't want them leaving the community. They say they do, but they don't, because I can see the things that they're doing at home, or when they get into high school they're not doing anything to help things, maybe because they don't know what to do. . .

Another striking aspect of the district that sets Maple Grove apart from many other school districts of similar size, and an aspect that becomes part of the rules controlling the game is the amount of property tax revenues the district received in 2002. Because of the location of a major utility company's power plant within the boundaries of the district, Maple Grove Schools realized an income of $3,032,000 in property tax revenues (National Center for Educational Statistics, 2003). Maple Grove's entire income amounted to $4.576 million making

property tax responsible for 84.7% of the schools income. In addition, Maple Grove received only $28,000 in General Formula Assistance from the state government, a mere 0.61% of its budget. With a total district population of 1,424 children between the ages of 0 and 19 years, Maple Grove spends approximately $3,213 per child.

Hence, finances are not a cause for concern at Maple Grove. Middle School Principal Chuck Randalia explained:

> We're in a very fortunate situation here at Maple Grove where finances have not really been a problem, and, of course, the schools in [this state] are all facing budget problems, so, we're kind of spoiled here. We do receive a lot of our money through grants that are written due to the fact that we have a high Native American population. So, I'm going to say that's where . . . the money comes from.

Aaron Westgate echoed Mr. Randalia's sentiments when he noted that he could requisition any piece of hardware or any software title, no matter what the cost, and would have it approved and delivered as soon as is could be arranged. Susan Oran also noted that she did not feel as if the school administration at either the middle school level or the district level overtly stated or insinuated that teachers in the district spend too much money on instructional technology resources. She believes that the district would let teachers know if it thought

teachers were being wasteful of financial resources.

The Game

> *Every social environment has some focal purpose and common activities.*
>
> *(Lingenfelter, 1996, p. 39)*

On any given day at Maple Grove Middle School, students and teachers alike are using instructional technology in many different ways. Every teacher's desk and staff member's workstation is computer enabled. School secretaries, central office staff, and up and down the halls in classrooms are computers and other instructional technology devices being used in a way that does not seem unusual to the Maple Grove population. Mr. Randalia is proud of his school's instructional technology resources and the ways in which those resources get used by teachers:

> It's just an every day tool; it's nothing. We don't look at it as anything special anymore, it's just what we have, we use it, that's just the way it is and, you know, it's just great, it's a great feeling now that we have it that way. . . . I'm very pleased as a principal where our staff's at; I don't worry at all anymore about whether a teacher's using it or not. I don't have to; they do it for themselves now. They'll get in whatever, whether it's with the computer, or digital cameras, whatever the technology is. I keep saying computers, not, it's not just computers anymore . . . all of our

teachers, they're always trying to come up with some new idea in the classroom to use, to get the kids doing something different.

Because instructional technology is such a prevalent part of Maple Grove's instruction, both how and why teachers use instructional technology is important to understanding the game aspects of the culture. Technology use at Maple Grove falls into two categories: required uses and uses left to the discretion of the individual teacher. Maple Grove uses *PowerSchool* software. *PowerSchool* is a web-based student information system distributed by Apple Computing. Via a browser-based interface, it allows administrators access to student data in order to facilitate decision-making; it gives teachers classroom administration tools such as attendance records, lesson plan storage, and grade management; it allows parents password-protected access to their children's grades; and it allows students to track their own progress in their individual courses. Use of the software by teachers at Maple Grove is not optional; the school system has adopted it as its student information management system and all teachers are required to use the applications for grade administration and attendance reporting. Ms. Readlyn, who works directly with teachers and instructional technology, hears both complaints and praises of the mandates for using *PowerSchool*:

I know there's still some teachers that would maybe prefer that we do

grade books and lesson plans with paper and pen, that they find that easier, but ultimately if you spend the time to put your lesson plans in a digital format, that first year is always the hardest, you have to get all that in there, but the long term effect in being able to look back and say, "OK, I did this . . ." and being able to tweak and refine your lesson plan, I think is much easier when you have it in a digital format as opposed to a lot of papers and things like that.

Aaron Westgate reports that there are few other mandates on teachers in regards to instructional technology use:

> We have very, very few mandates. Only thing they require us to do is a couple PowerPoint slide shows, have a small web page of our class schedule, things like that. The mandates that we have at Maple Grove do not require you to be technologically advanced.

Chuck Randalia also indicated that there are few instructional technology-use mandates placed on teachers by the administration. "What I was having my teachers do was to e-mail. That was one thing they all had to do: they had to know how to e-mail." However, he did hint at the level at which instructional technology is important at Maple Grove Middle School. "You can't survive at Maple Grove if you don't, if you can't use technology; it just won't happen because so much is required as a teacher, you know, using the computer."

Every grade level at Maple Grove uses instructional technology to some extent. Teachers in the elementary school have certain applications that they can draw upon to enrich their curriculum; Mr. Westgate and Ms. Oran are excellent examples of how teachers in the middle school make instructional technology a transparent instructional apparatus in their classrooms; and at the high school level, laptop computers are ubiquitous among both students and teachers.

Why does Maple Grove use instructional technology to the extent that it does? Of course, much of the answer to that question is linked to the efforts of former superintendent Robert Fayette. However, since his departure, there has not been an abandoning of instructional technology in Maple Grove Middle School. Mr. Randalia characterized the school's use of instructional technology this way:

> I believe it's [instructional technology use at Maple Grove] to get our kids ready for what's out there when they graduate . . . to try to enhance their learning while they're here, to try to motivate them, to get them excited about education and learning. But I think the main purpose is to have them ready for what the world's going to hand them when they graduate, get them ready for college. So....yeah, I think that's the most important thing we can do as far as technology is concerned . . . I hope we're doing what we need to be doing.

From the technology support person's perspective, Mrs. Readlyn praises the teachers at Maple Grove for being the group most responsible for the successful use of instructional technology and why Maple Grove maintains the level of use it does:

> The reason that it is used successfully is because I think the teachers believe that it is the direction that they need to go, and I don't necessarily think that teachers always like it. It's hard: there are a lot of frustrations that come with every kid in your class having a computer in front of them. Things don't work sometimes, they don't work the way you thought they were going to work. Kids get sidetracked, you know, that happens when you have a one-to-one program [one student to one computer]. You have 25 kids: are all those kids going to be engaged in what you want them to be doing, or is some kid going to be over here listening to the music, or is some kid over here trying to find the coolest game on the Web? That is going to happen, and so, classroom management is an issue, you know, and there have been, there are frustrations with that. I think sometimes it is frustrating for the teachers, but underneath all of it, I think that they really do believe that it provides the kids with the best learning experience; that they're able to retain the information better.

Maple Grove Middle School is a school in transition. The departure of

long-time superintendent Robert Fayette means a definite change in the way Maple Grove teachers are expected to use instructional technology. Many teachers in the school make use of the abundant tools available to them; others use them only to do what is mandated by the administration. However, for teachers who want to integrate instructional technology into their classes, Maple Grove is still a Mecca: completely wireless high-speed network connectivity available throughout the building and across the campus, computing technology available to teachers in each classroom of the middle school should they want it; a principal who is very supportive of their instructional technology innovations, triumphs, and frustrations, one who is determined to continue to make use of the instructional technology made available through Mr. Fayette's work, yet one who recognizes that not all teachers will embrace instructional technology equally and accepts those differences.

Mrs. Readlyn probably summarized the climate of Maple Grove Middle School and the instructional technology they have at their fingertips. ". . . if you were a technology using [teacher] and loved technology, this was the place to be."

Case Two: Hillwood Junior High School

The Playing Field

> *"The space dimension of a social environment provides the playing field upon which people engage in meaningful social action. It is essential to understand the component of that social space to know how people classify and define that space and to understand the significance of space in terms of meaningful action. (Lingenfelter, 1996, p. 36)*

Hillwood Junior High School is a hand-me-down school. Housed in the former high school building now that the high school has a new residence in a different location and across town, this school year is a year of change for Hillwood. Not only has Hillwood taken over the former high school building, but the district itself has undergone restructuring so that the former elementary, intermediate school, high school system is now broken into four parts: elementary, intermediate school, junior high, and high school.

The main campus of Hillwood Schools is comprised of the intermediate (grades 4-6) and junior high schools (grades 7-9), and it is a conglomeration of mismatched buildings. As Hillwood grew and demanded more space, buildings were constructed. The new high school and the elementary buildings are apart from the main complex and located on the outskirts of town in two different locations, but both are approximately 3 miles from the intermediate and junior

high school site.

Hillwood itself is a sustaining community. Its downtown business district has both viable commerce and abandoned storefronts. There are restaurants, a grocery store, a variety store, a bank, and various other businesses situated along the main street, which is also a state highway. With a population of about 2,200, Hillwood is the kind of town where most people know most other people and much of life in the town centers around the activities of the schools.

Hillwood Junior High School is not a particularly memorable building. The building itself is of brown brick construction. Hillwood's school colors are black and white, and the tile floor is black and white alternating square tiles. The walls are white, and there are occasional mascots painted on the walls in shades of black and gray. Entering the building through the main doors, visitors are directed to the office to sign in. In each visit to Hillwood, while the researcher did report to the office, he was never asked to sign in and given an identification badge only once. That he quickly became a familiar face to the office personnel at Hillwood speaks to the school's ability to get to know its patrons, parents, and students quickly and easily.

Demographically, Hillwood is a not a diverse district. With a district-wide population under the age of 18 of 1,686, 82.4% (1,390) are White, 1.8% (30) are African American, and 8.3% (140) are Native American. There are 68 certificated

staff members in the Hillwood school district; they are mostly White and about half live within the district while half live in a nearby city.

It is also necessary to note that the Hillwood district is comprised not only of the town of Hillwood and the surrounding country, but also a much smaller community, Prairieton, with a population of 486.

The hallways at Hillwood Junior High are lined with lockers. They are non-descript, looking like lockers in a hundred schools across the country. Some are closed and locked, their contents not visible to passers by; others are open and their contents spilling out, a mess of papers, books, pencils, and backpacks. There is little noise in the halls except at passing time. An occasional student walks by always seeming to be going somewhere with purpose.

Each classroom at Hillwood looks like most other classrooms: rows of traditional desks facing a chalkboard or a white board. Rooms are equipped with overhead projectors of the older versions requiring acetate sheets and colored water-based markers. The researcher often observed teachers using these in their daily teaching. There is little instructional technology immediately visible, though most teachers have a computer and a printer on their desks. Because of the high school's move to a new building and the subsequent restructuring of grades 4-9, there is more room for teachers. In the past, some teachers have shared classrooms, which meant that two teachers in one room needed only one

computer between them. Now, most teachers have their own classroom, and that has meant a need for additional computers so that the school can meet its goal of having a desktop computer for each teacher. Shelley Hills, a language arts teacher at Hillwood, described the teacher/computer setup:

> It's been a really big goal here at our school that each classroom has at least one working computer with printer access and Internet access. And that's something that we really strive toward. If funds are there, it's taken care of right away. Now, we've changed configurations in the last year so we have different people in different classrooms than they've been in in the past. More people have their very own classroom instead of sharing which means a need for more computers, so this year has been a transition for us. Not everyone has their own computer just yet, but it's being worked on . . . it's a goal for this year that it happen.

However, other teachers spoke of a computer in each classroom as the norm at Hillwood. There is some discrepancy in teacher knowledge of instructional technology availability at Hillwood. In another interview, a teacher wished for access to the computer lab to use CD-ROMs that came ancillary to her recently adopted textbook. This teacher did have two computers in her classroom at the time of my visit; however, it did not appear to be an option to allow students to use the CD-ROMs on an individual basis. Rather, she felt for the instructional

technology to be effective, she needed her entire class in a computer lab each at his or her own workstation to use the disks.

The library at Hillwood is not a central feature of the building; it seems that two classrooms were joined by removing the wall between to form a double sized room in which the library is now located. Mary Brighton, the school librarian/technology coordinator discussed the size of the space available to her for the library:

> I had the other library over there at the Intermediate school, and they took away half my space, and I had to pack everything into the half that I was going to get to keep. Then when finally this space became available, then bring all the books over here and straighten them all out and hope we got them in the right places.

Even with the high school moving to new quarters and the open space left by that move, space is at a premium at Hillwood Junior High.

The books on the library shelves vary from old and obsolete to fairly new and current. Mrs. Brighton admits that the move allowed her to weed the collection and remove a number of obsolete books, but she also wishes she could weed even more. However, lack of funds to replace those books prevents her from removing all obsolete books from the collections.

What is most noticeable about the library is the availability of three

computer workstations. None of the three matches; they are probably placed in the library after being replaced for new equipment in another room. The library catalog is in electronic format and Hillwood users have access on the library's computers. Mrs. Brighton has set for herself a goal of having the library catalog available to students and teachers from the classroom "so that they could check from their classrooms to see if we had a particular book."

Teachers at Hillwood have access to a computer lab with 25 PCs. A quick scan of the lab indicates that most do not match one another and no attempt has been made to standardize the desktop. The computers have a wide variety of installed applications. Each machine runs on the Windows 95 operating system. While the lab is mostly scheduled by the technology education teacher, it is possible for individual teachers to schedule class time. Also available for use is a 14-computer mobile laptop lab. These computers have wireless capabilities with a wireless hub built into the cart. Hillwood Junior High principal Charles Riverside is hopeful about the possibilities for the mobile lab:

> We've got 14 laptops on a wireless cart, and students love that. We'll see just how long, even watching the kids have their hands on them, you know, they're laptops and all, we'll see what the longevity or how long they'll last or if we start having problems. But the kids love it.

In addition to the existing computer lab classroom and the mobile computer lab,

Mr. Riverside is in hopes of adding an additional computer lab classroom with 25 computers:

> We are looking at adding a 25-computer lab and we're going with Orchard software, and it'll be a 4th grade through 9th grade program that will do the math, sciences, and language skills. Teachers can take classes in; we usually try to set that up and make it available one period a week for each class. Now some teachers don't want to have anything to do with it, some teachers would like to have, on projects, two or three days. We just kind of work that out then, if it comes up.

Some of Hillwood's access is a result of Mrs. Brighton's work with eRate, the federal government's Universal Service Fund (USF), which provides communities across the country with affordable telecommunication services. The school also receives T-1 Internet access via OneNET, the state's telecommunications and information network for education and government. The service is a division of the state Regents for Higher Education operated in cooperation with the state's Office of State Finance. Those two government programs account for a majority of the telecommunications service access Hillwood has including Internet, local telephone service, and long-distance telephone service. Mrs. Brighton describes Hillwood's position on eRate:

> We're not at the top, and we're not at the bottom. Not by any means are

> we at the top, and neither are we, by any means, at the bottom, because occasionally I hear of some place that hasn't even ever filed an eRate form yet, and they don't, and I'm thinking, what?, I mean, why not . . .

Mrs. Brighton recognizes the value of work involved in filing the eRate application and recognizes the assets it brings to the school.

Hillwood is certainly not without technology. The school is making a priority of placing computers on teachers' desks, and the administration is requiring the use of electronic grade books and attendance records. In addition, Mr. Riverside indicated that the technology education program is branching out, providing opportunities beyond basic training on simple computing applications to students. He referred to video production and career-based technology as new areas of program emphasis in technology education. Students enrolling in keyboarding class now learn those skills via computer technology rather than traditional typewriting. Mr. Riverside pointed out that teaching keyboarding on computers at Hillwood was much like teaching drivers' education courses:

> What I see more than anything is our keyboarding classes. It's kind of like drivers' ed, I mentioned I'd grown up in a rural area, and that I've taught drivers' ed for a while. Some of the kids have never much more than set behind the wheel; some of them have been driving forever. You spend time breaking bad habits, that's kind of the way this keyboarding thing is:

often time you spend more time breaking habits and trying to get them to learn to type correctly, type more effectively, and some of them are pretty quick like that . . . the thumbs, I'm amazed how well with these cell phones and all, with text messages, some of these kids are just phenomenal.

Other teachers, when asked about technology availability and use at Hillwood did point out that computer-based technology is not the only technology used at the school. Laura Wellman, foreign language teacher, spoke of using cassette tape players and audio compact disc players to listen to readings. Donna Fairfield, a mathematics teacher shared between Hillwood High School and Hillwood Junior High, uses calculators in her classroom. Shelley Hills even uses traditional board games as a reward system in her language arts classes.

The Players

> *The people who consider a particular playing field a legitimate place in which they spend meaningful time are the subject of our research. It is people who establish relationships with one another and engage in activities together. (Lingenfelter, 1996, p. 36-37)*

Central administration at Hillwood Schools. Mr. John Kinross, the superintendent of Hillwood Schools, is often seen in the hallways of Hillwood

Junior High School, and while the offices of the central district administration are easily accessible to teachers and building administrators at Hillwood Junior High, the central district administration at Hillwood does not play a significant role in the life of teachers and building administrators. In all discussions about classroom use of technology including mandated uses, pedagogical issues, financing technology, and acquisition of resources, none of the interviewees indicated that the central administration played a significant role in any of those areas.

The junior high school administration. The atmosphere at Hillwood Junior High School is relaxed: students lounge about the entryway prior to the start of the school day and the junior high main office is the hub of school activity. During each visit, the researcher observed teachers and staff members, students and parents all visiting the junior high main office both on school business and as a social place. On his first visits to Hillwood, the researcher checked in with the school secretary, Judy Tiffin, and explained the purpose of his visit. After the first visit, Mrs. Tiffin recognized the researcher immediately and often just waved as he headed to his destination. He was never asked to sign a visitor's roster and was provided a visitor's name badge only one time.

The junior high administration at Hillwood is divided between two positions. Randall Washington is listed by the Oklahoma State Department of

Education as the principal for both Hillwood Intermediate School, grades 4, 5, and 6, and Hillwood Junior High School, grades 7, 8, and 9. Charles Riverside is the assistant principal for both of those centers. However, in reality, the division of administration is slightly different. Mr. Washington is primarily responsible for the intermediate school and has given Mr. Riverside wide latitude to make decisions on behalf of the junior high. Mr. Riverside had been serving as half-time assistant principal of the elementary school and half-time assistant principal at the middle school under the former site structure. Presently, he is technically assistant principal, but indicates that Mr. Washington has put him basically "in charge" of the junior high. Mr. Riverside is fully qualified and certified to hold the position of principal, having earned his certification following successful completion of the certification exam two years ago.

It is clear, though, that Mr. Washington has ultimate decision-making power within Hillwood Junior High and Intermediate Schools. In requesting permission to do the study at Hillwood, the researcher met with both Mr. Washington and Mr. Riverside. Following a discussion of details of the study and the commitment on the part of Hillwood, it was Mr. Washington who signed the letter of permission. He did, however, ask Mr. Riverside if the study was something in which the junior high would like to participate. All further administrative discussions about Hillwood Junior High involved Mr. Riverside.

Mr. Riverside's definition of technology is similar to others at Hillwood Junior High School and to most in education:

> I want to say technology has to do with electronics, computers, with PDA's, any of that. I know there's more things than that in the schools right now, but that's kind of what we're limited to . . . . If I had to just really cubby hole it, it's the way we utilize those to tie in with the other disciplines. It allows us to actually teach . . . as a matter of fact, with the advent of the Internet coming into the schools, there's as much bad as there is on it, there's some fantastic sites that allow kids to go on and to enrich, to research, to expand their knowledge base, what an accessible base they have.

Mr. Riverside indicated his position on technology's place in education as "dovetailing in with education" and has watched Hillwood meet that change over time simply by growing into technology as technology has increased.

In addition, Mr. Riverside is proud of his school's beginning to use technology in the classroom in more productive, learning ways:

> We're using it, what I think is very effectively in education. There are a lot of applications. I know when I first started seeing it used, it was more as a reward-type thing, kids having the opportunity to use the computers and all. But I begin to see the software, some of the projects and all, the kids

are doing, it lends itself more towards career-type education, career development, . . . our tech-ed program is an excellent program, kind of showing how she's [technology education teacher, Cynthia Richmond] tying in the technology available, giving the kids a taste of that, so as they start looking for a career direction and all, it's an introduction. It's used in all of our classes . . .

However, Mr. Riverside is concerned with teacher buy-in. He understands the range of technology skills evident in his teaching staff and knows that Hillwood will have to work to continue to achieve teacher acceptance of technology. In an effort to make teachers more aware of the capabilities of technology, the administration at Hillwood requires teachers to use an electronic grade book system. The program facilitates quick access to student progress and makes Mr. Riverside's weekly checks for extra-curricular activity eligibility much easier.

In looking to the future, Mr. Riverside sees a increase in the use of technology and its influence on teaching and learning:

[technology is] one of the exciting, really exciting things that are coming that's still growing. I don't think we've really tapped into what we're going to be. We don't look at anything now like we did 5 years ago, and I think 5 years from now we're not going to recognize where we're at at this

time with what we're going to be able to do with it.

Teachers at Hillwood Junior High School. Both teachers who consider themselves heavy technology users and those who do not are evident at Hillwood. Mrs. Shelley Hills considers herself a technology using teacher, so much so that "it's hard sometimes to think about exactly what you do because you get in the habit . . . " She has found technology a way to make her job less time consuming than in the past:

> I feel like technology has, in a lot of ways, made my job a lot easier. I have always felt that each week the kids needed their grade to know exactly where they're at and to know any assignment they're missing. Well, I remember my first couple of years and I wasn't married, I didn't have kids, I would spend all of Wednesday night grading, just typing in, ten-keying it out, writing them a list of missing work, this needs to be in by so and so...and it, it took hours, it literally took hours. Now, whenever I have a free minute, I type it into the computer, I print it when I have free time, doesn't take nearly the time. So it's just made my job a lot easier: I can instantaneously know what their grade is, and I have very few errors.

In addition to easing her grading workload, Mrs. Hills uses technology and especially the Internet and World Wide Web as a way to increase her effectiveness as a classroom teacher:

> I use websites to look up information. I also utilize some of the websites online that provide me with different spelling lessons and vocabulary lessons. Of course, I use some programs that we have just for testing purposes that are online. I work with Title IX students and so it's really helpful. I have a test that's on my computer system. I put them on [the computer], they finish sentences, or they can also do math and in 15 minutes I have a pretty good idea of what grade level they're at whereas before I had that, I would spend hours giving different kinds of tests just to get an accurate read on reading grade level, math level that they're at.

She also posts her lesson plans online at SchoolNotes.com, a free web resource for teachers.

Conversely, there are teachers at Hillwood who use technology only at the levels proscribed by the administration. Laura Wellman does not characterize herself as a technology-using teacher. Like others at Hillwood, she has a computer on her desk with Internet access. On the day the researcher visited her classroom, there was an additional computer on a mobile cart available in the room as well. Mrs. Wellman is a language teacher, responsible for teaching Spanish at Hillwood Junior High. She characterizes herself as a grudging user of technology, ". . . it just doesn't come naturally, I'm just not that interested in it and, you know, I'll pretty much do what I have to but, it's just not my thing." She

does admits that what she does do with technology is helpful to her. As mandated by the building administration, she keeps her grades electronically, and she emails an attendance report each hour to the school secretary.

While Mrs. Wellman does not consider herself a technology-using teacher, neither is she averse to technology use. Mrs. Wellman discussed from where her attitudes about technology come:

> I don't know if it has to do with the fact that my interests and talents don't lie in the math and science area . . . and maybe that's connected. If there's one way for it to happen, you know, like in math it's either right or wrong, and on the computer, it won't work with me. It has its own little mind and, I have to try to figure it out.

In looking at what technology she would like to have available, Mrs. Wellman describes the need for a computer classroom that will allow her to use the multimedia CD-ROMs that are ancillary to her classroom textbook. Not having a lab readily available is a barrier to her technology integration. Hillwood is in the process of evaluating its computer hardware holdings and is contemplating the addition of a 25-computer laboratory. With the additional computing capabilities, others like Mrs. Wellman could very well increase their level of technology integration.

She does, however, use some tools that are helpful to her and easy to use.

These tools fall into the category of teacher productivity tools and communication tools and are not directly used as instructional tools. Like Mrs. Hills, she posts weekly lesson plans and announcements on SchoolNotes.com. Her notes include both the current week's information and the previous week's. Mrs. Wellman recognizes the usefulness of her SchoolNotes.com website for both students and parents alike. It is interesting to note that Mrs. Wellman's SchoolNotes.com website is not a central part of her teaching. During her interview, discussion topics focused on technology and its role at Hillwood. Mrs. Wellman did not bring up the topic of SchoolNotes.com during the formal interview; however, almost immediately after the conclusion of the interview, she recalled not having mentioned the website. The interview resumed, and she described her use of SchoolNotes.com.

Donna Fairfield, a mathematics teacher at Hillwood, characterizes herself as technology-using teacher, using what technology is available. She recounts her previous position with a school district in a wealthy suburb of the second largest city in the state where a computer lab was available as needed and she made use of the lab on a weekly basis. In addition, the computers in the lab had software that was purchased and available. Mrs. Fairfield indicated that such a lab was not available at Hillwood, neither at the junior high nor the high school. What computers are available do not have specific software and she felt limited to

using only Internet web sites related to mathematics. Mrs. Fairfield counts among other technologies available for use in the mathematics classroom graphing calculators of which she has classroom sets. However, she has had philosophical disagreements with the principal at Hillwood Junior High, Mr. Washington, about the use of such equipment:

> He [Mr. Washington] thinks that all the kids, no kid should have a calculator, period; that everybody should be able to add, subtract, multiply, divide, we shouldn't have any need for that. I'm trying to teach them an algebra concept. If they come to me flunking 6th grade, 7th grade, and 8th grade, which is possible because Mom can say, "oh, it's OK, I'll send you on." I've got kids in my class that are in that situation, they've flunked the last three years. I'm trying to teach them a concept and they can't add or subtract, multiply or divide. I believe, in my philosophy, give them a calculator, teach them how to survive for the real world, and that's my philosophy. He does not see it that way.

In this particular situation with this teacher, Mr. Washington exerts his authority as principal and excludes the use of calculators in the mathematics classroom. Mrs. Fairfield even characterizes Mr. Washington as "old school, not real key on technology, especially with math."

In their attempts to integrate technology, teachers at Hillwood rely on

several means to access training. Formal training comes by way of professional development workshops provided by both experts brought in from outside the district and by the school technology coordinator, Mrs. Brighton. Teachers also have traveled outside the district to take formal training in the form of workshops at area universities and school districts. Informally, Mrs. Hills is a resource for less technologically eager teachers. Because she is an early adopter at Hillwood, teachers often call on her for assistance, especially when using the mandated grade book application:

> Last year, I spent a lot of my time going and helping some people with that. But, they also realize that when they did it, how much easier it was to print reports that we wanted and give information to parents. It's just not possible for us to write down every missing assignment for every student, and with a computerized grade book we can, and the parents know right away, they're [students] not doing well on tests, that's what's bringing the grade down, and so that's made a difference.

Mrs. Fairfield has enrolled in courses at the local state university to learn how to use computer applications, and she indicates that the administration at the high school where she spends the majority of her time encourages teachers to access training, even providing information about upcoming events and demonstrating a willingness to fund training by paying training fees and providing substitute

teachers.

In addition to classroom uses of technology, teachers use technology in their personal lives as well. Mrs. Hills uses technology outside of school communicating with family and friends via email and using the World Wide Web to learn about competitions in which her husband participates. Mrs. Wellman, a self-described grudging technology user, reported that she is the newsletter editor for a statewide organization:

> I do a newsletter for a state wide organization, it's Master's Swimming...um, it's ages 19 and up and, um, we have meets and, workouts, and we have a state organization which is affiliated with the national organization. . . . I do the newsletter on Word, and then (I'm very proud of myself for this), I learned how to update, no wait, upload it to my FTP space, and then this guy over in Tulsa gets it or finds it or whatever, and then he puts it on our website. So, I am still very proud of myself for figuring that out.

While this use is not directly tied to instruction and not directly related to her career as a teacher, it is interesting that the level of use is well beyond what is expected by the school administration. In addition, it demonstrates a level of proficiency not typical of a self-described grudging user of technology. Mrs. Fairfield sees practical uses for technology, "I don't know how I lived without

my cell phone! And 5 years ago, I wouldn't have cared about one."

Technology for teacher use at Hillwood comes from different sources. Mrs. Hills has access to funds through her Title IX position with which she can purchase technology, but also spends personal funds on software from time to time. Mrs. Fairfield attends workshops where, for the cost of the workshop fee, attendees take home the technology on which they have just been trained:

> They'll have a workshop you can go to where they will give you five calculators, or something like this, and the teachers will get together and if they'll let us send more than one person from the site, we'll get together and maybe two or three of us will go, so then we might even have a classroom set eventually.

There is an understanding of the importance of technology at Hillwood. Interviewees all agreed that technology is fast becoming an integral part of life, and schools must work to provide students skills to operate the technology they will meet in both home and career. Donna Fairfield explains the importance further:

> I just think it's just society: we've got to change with the times. If we don't teach these kids technology in school, when they go to college, they're going to be behind already, because there're so many things just in college to do technology. . . . we're supposed to be preparing these kids to be

functioning adults and if we don't expose them and teach them the technology that's out there (it changes all the time) . . . we've got to keep doing it, or we're setting them up for failure, they're not going to make it.

Technology support at Hillwood. Hillwood Junior High employs one person whose responsibilities include managing the school library media center and coordinating the schools technology infrastructure. Mrs. Mary Brighton has been affiliated with Hillwood for over 25 years as both classroom teacher and media specialist. She recognizes what changes technology has brought about:

> These kids, this age, have never known a time when there wasn't a computer, and so, it's just like pushing a button on a TV, or a phone, as far as they're concerned. For some of the rest of us, who are a little bit older, it's not that way, we had to learn it all, and so I think it may be a little bit of hesitancy just because of unfamiliarity with it, or resistance to change, or whatever the case might be here. Others are just using it for an advantage because they feel like it makes things easier for them, helps them keep better records.

She does, however, realize that Hillwood may lag behind its peer schools in the availability of technology hardware including computers, multi-media projectors, Palm Pilots®, and other new devices. She does make a point of indicating that Hillwood teachers do have access to video playback systems

including VHS tape machines and DVD players. She also recognizes that technology is not limited to electronic devices as she explained that Hillwood has plenty of chalk.

Mrs. Brighton serves on Hillwood's technology committee along the other library media specialists in the district. The committee is charged with developing the school's technology plan and meeting periodically to see that progress is made toward the goals expressed in that plan. She was appointed to the committee by the district superintendent, Mr. John Kinross:

> Mr. Kinross said, "we think that we're going to need computers and Internet access, and all that kind of stuff." He listened to us, and so he put in a dialup in each library at that point. From that point we said, "Well we need more than this, it needs to go further." He then said that we should work toward a goal, and so we wrote the technology plan and try to update it on a yearly basis, and work toward an end. Never have we gotten there entirely; it's always fluid: it changes from time to time because what we think is the most important thing this year, by the time the next year rolls around and by the time we get funds, it actually has changed, on what's most important or technology has changed and advanced in such a form and fashion that we can skip a step and go to the next one. But the librarians are always a part of the technology committee,

and then one administrator and some classroom teachers.

Overall, Mrs. Brighton speaks of the use of technology across the teaching staff with guarded optimism:

> I think a lot of them use word processing and they record their grades . . . but I still see lots of teachers who are not just real comfortable with computers: they are a little bit afraid of breaking them, losing something somewhere, and yeah you can, and yes I have, and been pretty distraught over it . . .

Students at Hillwood Junior High School. Students at Hillwood Junior High exhibit a moderate level of competence in using technology. Mrs. Shelley Hills describes the changes she has seen in just the past five to six years:

> A lot of the kids have computers at home now, too, so many of them know. . . . So, we have some students that are very knowledgeable with computers, I feel like, most of our students feel fairly comfortable. You know, five or six years ago I had a lot kids that would have to come ask me how to turn the computer on if it wasn't on. They all know that now, they all know how to get to different programs. They have a basic working knowledge of how it works, and I think that's good.

In observing students at work in the computer lab, I noted many students able to navigate using the mouse and keyboard without the need for direct instruction.

When told to perform basic computer functions during a class website construction project, most students were very knowledgeable about system operations such as copy-and-paste, drag-and-drop, and basic menu functions such as saving. Lab computers each had different desktop configurations indicating that the computers are not administratively controlled or 'locked' and students have enough knowledge of operating systems to manipulate and individualize the desktops. In addition, no attempt seems to be made to reset computers to a default configuration as individual files stored on computer desktops are still available after at least one week's time.

Mrs. Laura Wellman notes that she tempers her expectations of technology use among her students with the knowledge that not all students have ready access to a computer. She estimates that 97-98% of the members of each class have a computer at home, but it is the 2-3% who do not who cause her to be uncomfortable *requiring* that computers be used in the production of out-of-class projects. Mrs. Mary Brighton also recognizes that not all students have ready access to computing technology and Internet services. The foundation for her opinion is a survey conducted by Hillwood several years ago wherein it was discovered that only 50-60% of the student population had a computer at home or had access to one at a close relative's home.

Overall, students appear readily able to use computers in a productive

manner given the opportunity to do so, and they are eager to get to work when presented with computers and given a specific task to complete.

The Rules of the Game

> *Every social environment has within it socially specified relationships. These relationships may be defined in terms of social roles and/or a collective organization of a group. The definitions by which people order their relationships and engage in activities with one another constitute the rules of the game. (Lingenfelter, 1996, p. 38)*

Laissez-faire is a French term meaning "hands off" and it applies to Hillwood Junior High's administration's stance on technology integration in classrooms. With the exception of the mandate to use the electronic grade book application, there are no expectations for technology use at Hillwood Junior High. Teachers are not evaluated on their use of instructional technology nor is there language in the standard employment contract directing the use of technology.

Technology does enter into the personnel equation when new teachers are hired at Hillwood. While there is no written expectation for technology use by current and new teachers, and the only mandated use is in grade keeping and attendance reporting, Mr. Riverside does factor technology use into his decisions on hiring new faculty members. He indicates that hiring new teachers who

already have technology experience or "buy-in" helps Hillwood get "the most bang for the buck" in teacher salaries.

Mrs. Laura Wellman summarized the administration's stance on mandating the use of technology and other classroom pedagogies:

> [The administration] . . . required the grade program and other than that, in terms of everything, they're pretty much hands off. They trust us to do our job and assume we are unless something comes up that points otherwise. They really don't tell us, do this and don't do that, although they did on the grades, but other than that, they're pretty much hands off, you do what you think you need to be doing.

Technology coordinator Mrs. Mary Brighton echoed Mrs. Wellman's characterization of the administration's hands-off position concerning computer use. She also characterized some teachers' computer capabilities:

> [Teachers are] using the computer for keeping grades because it's a mandated thing, and they also have to do attendance by email. So they have to use it [computer] for those two purposes, and some, a few, probably don't use it for anything much more than that. Some of them have great difficulty handling the . . . grade program, they just aren't savvy with the computer, and part of the problem might be, I don't know, the age, the era they grew up.

While no specific uses of technology outside the grade book and attendance applications are mandated, Hillwood principal Mr. Randall Washington has told mathematics teacher Mrs. Donna Fairfield that calculators should not be used in her teaching:

> The graphing calculators I use mainly at the high school level. Freshmen . . . that are taking Algebra I have to take that state test in the spring, and it's no calculator, so the principals here at this site will not allow us to use calculators in the classroom, because he doesn't want to set them up for failure on that state mandated test.

While she does follow this mandate, she also admits to bringing graphing calculators to the classroom for a short while so that students are exposed to the technology prior to their entry into the high school. These calculators are from the high school, evidence of the sharing of resources from building to building across the district.

Teachers at Hillwood, however, do not eschew the use of technology; they do rely on technology-using teachers to become resources for solving problems. Mrs. Shelley Hills, herself a technology-using teacher, recalls that the move to the electronic grade book was "a real transition for a lot of people" and that she spent much time assisting them with that transition. While the grade book application is now two years old, she finds that "some still struggle with it."

Mrs. Mary Brighton, technology coordinator, also contributes to teachers' technology skills by providing occasional workshops on basic computer skills:

> I've done little workshops for teachers as they have had need just to learn how to do simple Windows operations. Things like Alt-C is, I mean, Control-C is copy, Control-V is paste, just simple things like that that make life easier when you're trying to use the programs.

In addition, Hillwood has arranged for outside experts to provide training during teacher in-service and professional development days, and Hillwood has acquired grant funding to pay some expenses associated with teacher technology development.

Access to hardware and software is another issue of the rules of the game. Hillwood's annual operating budget is just under $6.2 million with 14.3% ($892,000) of that budget coming from local property taxes and 45% ($2.793 million) from the state in General Formula Assistance. Hillwood's total district population between the ages of 0 and 19 is 6,355; Hillwood spends an average of $978.37 per child.

Hillwood's building administration, central administration, and local board of education are an important factor in the acquisition of resources for school sites. The funds for acquiring resources come from a variety of places including grants, both state and federal; capital outlay; and other miscellaneous

resources. Technology resources have been purchased with federal Title funds, federal Carl Perkins Grant funds, and state Goals 2000 funds. Library technology has been purchased with money from building budgets, and, as Mrs. Brighton described:

> I sold cotton candy at lunch time, the teachers did when we had middle school and we could do that, and I saved money and saved money and saved money until I could buy a computer.

Other technology funds have come from a local wireless telephone service company that wanted to place a cellular tower on property owned by the school district. A fee was established and the funds divided on a per-student basis to each of the buildings in the district. Even the local Parents in Education (PIE) organization has donated funds to assist with technology in the school, purchasing the first computer used to convert the library card catalog to a database operation.

Mrs. Brighton described the process for purchasing a large-ticket item as beginning with the building principal who approves or disapproves the purchase. Mr. Charles Riverside, assistant principal responsible for Hillwood Junior High, indicated how the building administrators deal with budget requests:

> The principals then get together and look at what each of them are being

asked for, what their teachers are asking for. In fairness to the district, sometimes we take, it's not a large amount of money, but it needs to be spread as evenly and as fairly as it can be. And that's kind of what they look at. We do most of that up front: teachers will turn it in at the end of the year. Some of the monies for that may not be available until August, but what it is, they'll look and see what they can do, what we can get for the teachers, the direction they want to go, maybe visit with them and also see if there's a way they can get the direction they want to that would be a little bit cheaper or we can help more students . . . tie it in with something else where the number of students that we can serve would increase.

For smaller purchases, teachers write a purchase order and submit it to the building principal. There is little beyond that process; Laura Wellman describes it as "just tell them what it [is], put through a purchase order, and see if it would fly."

Access to existing resources is an informal procedure. Scheduling the computer lab is a matter of contacting the lab aide with a proposed date and checking a schedule to see if the lab is available. Library media resources are scheduled in much the same way: simply checking with the library media specialist to ascertain whether the desired tool is available on a given date. Few, if any, rules govern the use of these shared resources other than a 'first-come-

first-served' availability.

Funding sources vary, and teachers work individually on what they believe they want or need for their classrooms and requisition those items individually through their building principals. Principals work in concert with each other in order to maximize the purchasing power of the district and to ensure that funds spent are done so for the most good of the district and to serve the most students possible. One example of sharing of resources across buildings is evidenced by Mrs. Fairfield's bringing graphing calculators to the junior high from the high school. Existing resources are shared and rules governing their use are informal. All of these contribute to a culture of shared responsibility at Hillwood Junior High School.

The Game

> *Every social environment has some focal purpose and common activities.*
>
> *(Lingenfelter, 1996, p. 39)*

Hillwood Junior High uses technology because they believe it is their duty to expose students to what is existent in the world. Mr. Charles Riverside explained further:

> First of all, because it's out there, and especially career-wise, it's just going to increase, it's going to become more available. We use it first and foremost for the students; now we've had to go in kind of the backdoor

some other ways and apply it and require it for the faculty, to get the buy-in, but eventually that's going to trickle down.

Hillwood recognizes that technology use is prevalent in society and work and that students need the exposure to compete.

Hillwood has contracted with a consulting firm to spend time in the district evaluating Hillwood's technology resources. The organization, The HelpMySchool.NETwork, states as its mission to "take a comprehensive approach toward your school technology program and the special needs of your students. We provide you with the tools you need to make your technology program efficient and financially responsible." HelpMySchool's services include a menu of options available to school districts including specification writing, bidding services, technology plan management, onsite technical support, and asset management.

What is most interesting about Hillwood's contracting with HelpMySchool is that none of the teachers interviewed nor the technology coordinator indicated knowledge of the retention of the consulting firm. However, Mr. Riverside's notion of what the firm has done and will do was mentioned:

What we've done now is, there's a group out there called [HelpMySchool. Net]. They come in, they have looked and put their hands on every

computer we have in the district, they've looked at how we're set up, they've talked to teachers, how it's used and all. What they'll do is go back now, and look at the direction we want to go and help us get there a little more efficiently.

In summarizing why technology is used at the levels it is at Hillwood, Mrs. Shelley Hills described the overarching feeling toward technology at the school:

> I think it [teacher use or non-use of technology] has a lot to do with what they're comfortable with: people get used to doing things a certain way and it's difficult to change, and a lot of people that have not worked on computers fear them . . . they're afraid. I've had people come to me, especially in their grade book, and say, "I can't enter any more grades". Well, they don't even that know you can scroll across at the bottom to get to the information. You know, things like that frighten them because they don't have the knowledge yet. And so, I think, you know, I was lucky and I took some workshops and learned, and that helped. Some people choose to do that, and they become more comfortable with it; other people sometimes don't do that and so they're kind of fearing it and they also know that there are people around that they can ask to help them so they'll be all right.

Summary

Maple Grove Middle School and Hillwood Junior High are two very different school sites demonstrating various levels of instructional technology use. The cases presented are snapshots of the sites produced through interviews, observations, and document analysis. In the next two chapters, I will analyze the two cases using the literature reviewed in chapter two and the framework of Mary Douglas' (1982) typology of grid and group.

CHAPTER V

ANALYSIS

Chapter IV presented two cases describing middle schools in a lower Midwestern state. These cases were developed from data gathered through personal interviews, observation, and analysis of documents provided by teachers, administrators, and technology support personnel at each school site. One additional data source used to inform the study was a questionnaire developed to elicit information about the culture of the school site and assist in establishing which category of Mary Douglas' (1982) grid/group typology the site was to be placed. The questionnaire (Appendix D) was modeled after the questionnaire Stansberry (2001) used in her study of higher education faculty preferences for instructional technology use. That questionnaire was developed based on Douglas' framework and "grid and group questionnaires from previous studies combined with current literature in the areas of higher education faculty studies and instructional technology in higher education" (Stansberry, 2001, p. 163). For this study, the questionnaire was kept much in the

form Stansberry (2001) used with the exception of the changing of certain terms to be more appropriate for middle school teachers.

This chapter returns to the cases presented in Chapter IV and will analyze each case in the form in which it is presented following Lingenfelter's (1996) format which focuses on aspects of the social environment: the playing field (the physical space under consideration), the players (active participants in the space), the rules of the game (guidelines affecting relationships between active participants), and the game (activities of the participants). Each case's analysis is divided between grid considerations and group considerations. Within those divisions, the analysis begins with a study of the questionnaire results and then additional analysis of the environment (playing field, players, rules of the game, and the game) is taken into account in the findings.

Maple Grove Middle School

Maple Grove MS - Grid Considerations

Maple Grove MS - Grid questionnaire results. There are eight staff members at Maple Grove Middle School who met the criteria for participation in this study; that is, the majority of their responsibilities lie with students in grades six through eight. Of these eight, seven are classroom teachers and one is an administrator. In addition to those eight, invitations to participate in the survey were provided to the middle school secretary and the two district technology

coordinators/support personnel, for a total possible participation of eleven individuals.

Of eleven participants, four surveys were returned. Eight pairs of statements on the survey instrument measured the aspect of grid: the role of the individual within the organization. Of the eight, respondents chose two statements reflecting strong grid and five statements reflecting weak grid. The respondents were split in choosing between strong grid and weak grid on one set of statements. The five weak grid indicators include:

Item B: Within your classroom, teaching activities are self-directed.

Item C: Teacher responsibilities and roles are chosen by individual teachers.

Item F: Access to existing instructional material and facilities is obtained through individual teacher negotiation.

Item H: Curricular decisions and teaching methodologies are individually negotiated.

Item O: Hiring and placement decisions are individually negotiated.

Overall, the four respondents chose a total of 32 statements and chose weak grid statements in 22 instances and strong grid statements in 10. This would indicate that individuals at Maple Grove are given much leeway in determining their

individual courses of action on a daily basis. In addition, individuals negotiate with the administration in determining their role within the organization.

While the survey results are important in determining Maple Grove's culture, they are only one source of data and the study requires that additional data sources be used. Interviews, observations, and document analysis are presented below which complement the findings of the survey.

Maple Grove MS - Playing field, grid considerations. Former superintendent Robert Fayette had created an environment at Maple Grove Middle School wherein a wide variety of tools were made available to teachers and staff members with which they may perform their job functions. Though Mr. Fayette is no longer associated with the district, the technology-rich environment has on-going support from the new superintendent, Anne Waverly. In a weak grid culture, property is not a status symbol. Property in the form of technology hardware and software is not a status symbol at Maple Grove: everyone has whatever he or she needs to complete the tasks they determine are important. The wireless network is available in all locations on the school campus and each student has access to computing hardware whenever they or their teachers require it to be used.

These tools are made available to all on an equal basis; however, it should be noted that some individuals request and receive a greater abundance of tools

than others receive simply because they ask for them; those who do not ask for additional tools are content to work with the existent tools. A weak grid environment is one where teachers are allowed to choose the tools they need: Maple Grove's teachers make these decisions with the support of their building administrator.

The fluidity of the playing field is apparent at Maple Grove. All students have access to their laptop computers after school should they need them. While only grades 9-12 have the ability to take their computers home without additional bureaucracy, middle school students may check them out to take home if need is demonstrated. In addition, the playing field extends beyond the classroom at Maple Grove: the wireless network is broadcast outside the building to the school parking lot where students have access 24 hours a day, seven days a week should they want to drive to school to access it.

Maple Grove has created a playing field that affords all members of the organization a wide variety of options for technology use. All members of the group have access to the tools without regard to their role within the group and teacher members may decide for themselves at what level they wish to make use of the technology playing field. Such choices create a weak grid culture.

Maple Grove MS - Players, grid considerations. Individuals within an organization are governed by sets of rules. In strong grid situations, these rules

are stringent and members follow them explicitly and implicitly. Along a continuum, the fewer rules teachers must adhere to, the weaker the grid strength of the organization. When instructional technology first became a part of the landscape at Maple Grove, teachers were expected to use technology. That expectation was so high that instructional technology was made a part of the instrument used by administrators to evaluate teachers. Such mandated uses and the rules accompanying them would indicate a strong grid culture at Maple Grove. In addition, it should also be noted that evaluation instruments are negotiated items; teachers at the bargaining table negotiate the contents of the evaluation instrument and as such, a majority of the teachers at Maple Grove would have had to ratify that instrument indicating a high level of teacher approval for inclusion of use of instructional technology in the instrument. Mr. Randalia indicated that the evaluation instrument with an instructional technology component was needed to cause teachers to use the instructional technology that was becoming available. In essence, the administration at Maple Grove established a set of rules forcing all teachers to use technology. Such mandates are indicative of a grid culture so strong that failure to abide by those rules may have resulted in the termination of employment for teachers.

However, Mr. Randalia also noted that the evaluation procedure changed two years ago to remove the language regarding instructional technology use.

Instructional technology had become so infused into the daily life of Maple Grove there was no longer a need for teachers to be evaluated on its use. Such a move drastically lowered the grid strength at Maple Grove indicating teachers now have a choice in whether or not they used instructional technology. Mr. Randalia and others pointed to instances where some teachers maintained use of instructional technology at earlier expected and mandated levels, some continued to increase their use, while others reverted to previous levels of use or non-use. At the present time, the use of *PowerSchool*, the school's grade management and attendance system, is the only mandated use of instructional technology at Maple Grove.

Other indicators of the weak grid culture at Maple Grove include the easy access teachers enjoy to building level administrators and the district administrator. This blurring of lines of demarcation between the hierarchies indicates a loosely defined set of roles and responsibilities for individuals within the organization. The superintendent's office is in the same building as all other parts of the school system; teachers can enter the superintendent's office and speak to her without prior appointment. In fact, it appears that most anyone can speak with the superintendent on such an informal basis as her office is immediately inside the main door to the complex and there is no 'gate-keeper' to facilitate entry into the office.

Another indicator of weak grid is found in individual's changing roles and responsibilities, i.e., the role Aaron Westgate and Susan Oran play as peer mentors to other teachers integrating technology. Both have indicated they have helped other teachers and enjoy helping them; however, both shun the label of expert and often must defer to the technology coordinators when questions arise they cannot answer. Mr. Randalia, though, emphasizes his belief that both of those particular teachers are leaders in the school in using technology, going so far as to say they know as much as the technology coordinators. Other roles also have changed over time: Marcia Readlyn, one of two technology coordinators, spoke of her changing role at Maple Grove from that of simply technology integrator to that of network administrator.

Finally, students also indicate a weak grid culture at Maple Grove. Senior high students are allowed wide latitude in their use of computing technology as they are allowed to carry their laptops with them throughout the school day and even take the computers home with them. Middle school students are also given the opportunity to take computers home, but first must show some need. During the school day, middle school teachers have classroom sets of computers available for student use. Students are also allowed to use the video production facility unsupervised. One afternoon spent observing in that area revealed two

different students using the production facilities without direct teacher supervision.

With the amount of freedom teachers have to make decisions about how instructional technology is used in their classrooms, the ability to speak to administrative personnel at will, and the ability for students to make choices about how they choose to use instructional technology indicates that players at Maple Grove function within a weak grid culture.

Maple Grove MS - Rules of the game, grid considerations. Instructional technology use at Maple Grove is now left up to the discretion of the individual teacher. Some choose to use instructional technology heavily, integrating it into daily classroom activities; other use instructional technology only as much as the administration requires for grade and attendance reporting. Mr. Westgate indicated that he could not imagine anything he could ask for that his building principal would not have delivered the day after it was approved by the superintendent or board of education, if that level of approval was even needed. While Ms. Oran feels less need to make large-ticket purchases, she nonetheless does not feel as if the administration has ever indicated that teachers spend too much district money on technology purchases. This ability to negotiate individually for resource acquisition is indicative of weak grid culture at Maple Grove.

Maple Grove MS - The game, grid considerations. The *game* recognizes that there are certain foci and common activities around which organizations center. Prior to the change in the evaluation instrument, teachers at Maple Grove worked within a very strong grid environment with regard to the *game.* However, as the change in evaluation instrument caused the rules be less stringent and the expected use of instructional technology less than in the past, so too did the strength of the grid component weaken.

Teachers cannot escape instructional technology at Maple Grove. There are computers in classrooms available at all times. Students carry laptop computers with them throughout the school day, and there is little need for teachers to spend blocks of time 'training' students to use the instructional technology they have in their hands. Teachers cannot use lack of resources as a reason for deciding not to use instructional technology, as there is wide latitude to negotiate for resources and a history of providing whatever teachers ask for. The district enjoys this affluence mainly due to the fact that within its boundaries is a power generating plant whose parent company pays a large property tax bill each year. This affluence allows Maple Grove to meet the needs of teachers without much concern about cost.

With the variety of tools already available and the ease with which new tools can be acquired, teachers have the ability to make a myriad of choices about

which technology they want to use and how best to integrate it into their classrooms, a weak grid culture. The survey responses and evidence from the case study indicate Maple Grove is a weak grid environment.

The axis of grid examines the individual within an organization and the rules, roles, and responsibilities the individual must follow (in a strong grid culture) or the lack of rules, roles, and responsibilities to guide individuals (as in a weak grid culture). The contrasting complementary axis is the axis of group that examines the role the organization plays as a whole. A complete picture of an organization is found when both grid and group are examined.

Maple Grove MS - Group Considerations

Maple Grove MS - Group Questionnaire results. Nine pairs of statements on the survey examined the focus and mission of the group. Of the nine, respondents at Maple Grove chose five weak group statements and only one strong group statement. The respondents were split in choosing between weak group and strong group on three sets of statements. The five statements that indicate weak group were:

Item E: School communication channels are informal.

Item I: Teachers are motivated by self-defined interests.

Item J: Instructional materials and facilities are individually controlled by teachers.

Item M: School 'business' communication flows primarily through individual networks.

Item P: Social activities and work are kept separate activities.

Item P regarding social activities is especially telling in examining group culture. Here, group members do not derive their identity solely from the group; in other words, teachers at Maple Grove do not identify themselves as such when not involved in activities not related to school. Overall, the two respondents chose weak group statements 13 times and strong group statements only five times. This would indicate a weak group culture.

According to the survey results, teachers at Maple Grove show a tendency toward a weak group environment. As with the grid considerations though, the survey must be taken into account with other data sources as well. Analysis of the data collected via interviews, observation, and document analysis follows.

Maple Grove MS - The playing field, group considerations. Maple Grove's property and resources are arranged and managed for the benefit of the entire group indicating a strong group culture. Maple Grove is a single site school district with grades Kindergarten through 12 housed in one contiguous structure. Evidence exists of technology use at all levels of the school and Maple Grove is known throughout the state as a leader in instructional technology use. Even the community has supported the technology infrastructure through

passage of a bond issue to fund creation of the system and continued upgrading through 2014.

Maple Grove, though, evidenced weak group culture as well. Many of the staff live outside the district boundaries as they believe little acceptable housing is available within the two towns comprising Maple Grove School District. Interviewees may live in the next closest town, approximately 15 miles or in one of two larger cities within 30-35 miles of the school.

Within the school setting, there is evidence of weak group. There are physical resources that are not being used except on an individual basis. The video production studio is maintained, but does not see as much use as it did in the past when the creator of the facility encouraged its use and even taught classes in video production in the studio.

Maple Grove is not biased against outsiders entering the playing field, a weak group indicator. They have used outside trainers to provide professional development opportunities for teachers. Even the researcher's presence was not questioned in those times he visited the school and walked between classrooms and facilities.

Though there are tendencies of strong group, these tendencies are only existent due to the physical structure of the building and the passage of a bond issue by the community. The aspect of group focuses on the relationships that

members create within the organization and the extent to which they value those relationships. Maple Grove's teachers do no create collaborative relationships across curriculum, they do not maintain social relationships outside the school day, and, because they are a model for technology availability, they are accustomed to outsiders entering the playing field and they do not demonstrate a bias against these outsiders. Because the teachers at Maple Grove do not see the group to which they belong as being vital to them personally, they are a weak group culture.

Maple Grove MS - Players, group considerations. Group indicates the level of importance of relationships and the extent to which members of the group are committed to furthering the purposes of the group. At Maple Grove, long-time superintendent Robert Fayette recently left the district and has been replaced by Anne Waverly. Ms. Waverly brings no previous experience as a superintendent to the district and has yet to establish an agenda for where the district will focus its attentions in the future. However, one change at Maple Grove is immediately evident: no longer is technology as great an emphasis as it has been in the past. Each interview conducted at Maple Grove elicited that same theme: Ms. Waverly is not the technology leader that Mr. Fayette was. This movement away from the collective emphasis on technology is a weakening of group strength at Maple Grove. In the past, all teachers were expected to use technology at the same

minimum levels. This added to group strength in that teachers would invariably have a common discussion point each time they met. Taking away this common theme lessens the group's focus on technology integration.

In the past, in order to facilitate technology training, the school schedule was built so that students were dismissed at noon every Friday and teachers used Friday afternoons as professional development time to improve their technology skills. It was during this time that the technology coordinators provided training sessions on various software applications and hardware components and introduced newly acquired resources to teachers. In addition to improving teachers' technology skills, the Friday afternoon training sessions provided a focal point around technology that added to group strength. Since Mr. Fayette's departure, the modified schedule has been discontinued. Training sessions are no longer regularly scheduled and the technology coordinators indicate it has become more difficult to provide technology training or even introduce new resources to the staff. Others on staff also echoed this disappointment. Both Mrs. Oran and Mr. Westgate miss these training sessions and the time made available to improve their technology skills. However, Mr. Randalia notes that others on staff welcome the change in focus away from technology.

Maple Grove MS - The rules of the game, group considerations. One aspect of group is the consideration of relationships between individuals comprising the organization. Indicators of strong group include strong school spirit and loyalty to the school, strong pressure from group members on individuals to adhere to group norms. This is often evidenced by strong symbols of school mascots and slogans on signs and paintings throughout the school building (Harris, 2004): this is true at Maple Grove Middle School.

There is also evidence of community involvement in supporting the funding of technology at Maple Grove. A bond issue was passed by the district to fund the implementation of the current technology infrastructure. In addition to the start-up funds, the bond issue included ongoing funding to pay for necessary upgrades and planned obsolescence of hardware.

In the classroom, though, there is little indication of teachers working together to create collaborative projects with other teachers or classes. This is a strong indication of a weak group environment. Teachers keep lesson planning and resource creation to themselves. In the case of Mr. Westgate, sharing his lessons with other teachers in the school may present a problem in that he uses technology at a level far greater than others do.

One way in which Mrs. Oran demonstrates the power of relationships is in assigning a strong computer-using student to be a peer mentor to new

students who come to Maple Grove. Her assumption is that they do not have the same level of technology skills that Maple Grove students have simply because she knows that other schools do not have the resources available at the levels Maple Grove has. Mrs. Oran believes that an important aspect within her classroom is creating a culture where outsiders joining the group feel comfortable. This is a weak group indicator as the group aspect of the Douglas (1982) typology focuses on relationships: strong group cultures keep outsiders at bay and work to provide benefits only to those members; weak group cultures embrace new members. Indications are that Maple Grove's *rules of the game* culture leans toward a weak sense of group.

Maple Grove MS - The game, group considerations. On many days, visitors to Maple Grove will find students in all grade levels using technology in a variety of ways. Because there is this group focus on technology, Maple Grove's *game* is a strong group culture. However, the changing of superintendents at Maple Grove has caused a drastic change in the emphasis on technology. Yet, the mood at Maple Grove is one of relaxed anticipation; that is, teachers are pleased that the expectations for technology use have been lessened and are waiting to see what focus the new superintendent will choose. There is nothing to indicate that she will abandon the technology infrastructure and refuse to support it with adequate funding, but it should also be noted that Mr. Fayette used not only

district funds to pay for technology and technology infrastructure but relied heavily on grant funding sources as a means of adding to the existent funds.

Maple Grove is a weak group culture: its members do not place high value in establishing deep relationships with other members of the group and are focused upon their personal needs within the group and negotiating their way within the group without regard for how that affects survival of the group as a whole.

Maple Grove MS - Grid and Group Summary

In summary, Maple Grove School District is a technology-rich environment where teachers are given a number of tools that they may choose to integrate into their teaching. Efforts on the part of the former superintendent have created a school site where technology is taken for granted, where there are computers in every classroom everyday, where network access is not an issue, and time-shared labs are a thing of the past.

There is centralized control of resources at Maple Grove, and acquisition of resources is not a status symbol: teachers have whatever they need to do their jobs and are allowed to make decisions about classroom teaching without interference on the part of the administration. As teachers encounter a hardware or software need, they bring that need to the attention of the administration and

in all likelihood the administration meets that need without fanfare or reservation.

With the exception of the school's information system, *PowerSchool*, there are no longer mandates from the administration that dictate how teachers are to use technology. This freedom to choose is one of the major indicators of the weak grid typology at work at Maple Grove.

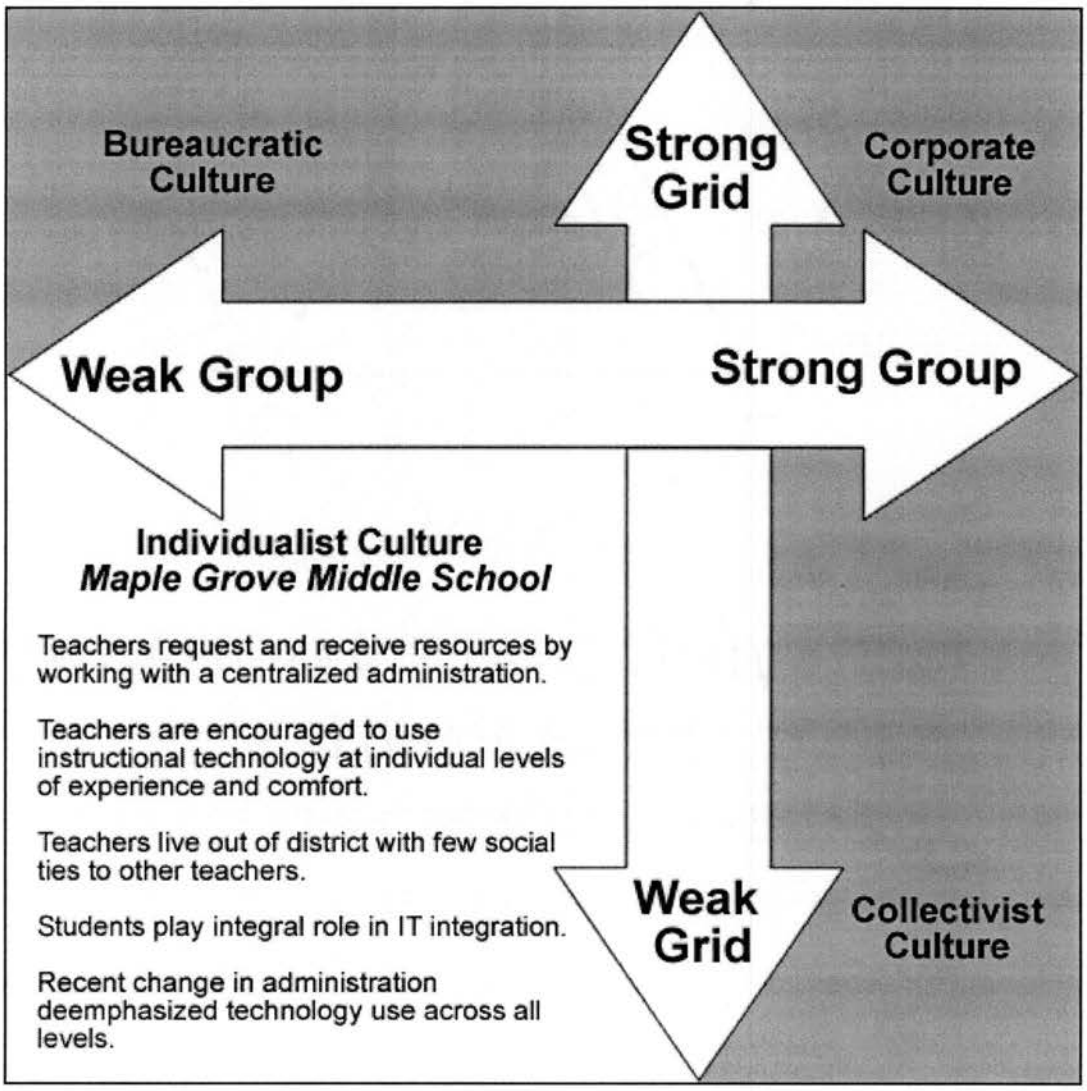
Students at Maple Grove Middle School, too, enjoy an environment where they may make choices about technology based upon their skills and desires. Students who need to may take computers home; they have access to them throughout the school day, and often influence the use of technology in the classroom. Allowing such student choices is also indicative of Maple Grove's weak grid culture.

Instructional technology is pervasive at Maple Grove. Throughout the building, there is evidence of the extent to which Mr. Fayette went to in order to provide the technology-rich environment. Yet, teachers do not work to create a strong group culture. They do not collaborate, they do not share lesson plans or materials, and they do not identify with Maple Grove much outside the school day. They live out of district and tend to have their own networks of friends outside of school.

These observations indicate that Maple Grove Middle School is a weak grid/weak group culture which Douglas (1982) calls Individualistic. *Figure 2* illustrates the grid/group typology of specific Maple Grove characteristics.

Figure 2

Maple Grove Middle School's Grid/Group Typology



Hillwood Junior High School

Hillwood JH - Grid Considerations

Hillwood JH - Grid questionnaire results. There are 22 staff members at Hillwood Junior High School who met the criteria for participation in this study: those staff members whose majority of responsibilities lies with students in grades six through eight. Of these 22, 20 are classroom teachers, one is an administrator, and one is the library media specialist/technology coordinator. In all, 11 surveys were returned, a return rate of 50%.

Eight of the pairs on the survey instrument measured the aspect of grid: the role of the individual within the organization. Respondents chose three statements reflecting weak grid and four statements indicating strong grid. They were split between choosing strong grid and weak grid on one of statements. The strong grid indicators included:

Item C: Teacher responsibilities and roles are assigned to individuals by administration.

Item G: Hiring and placement decisions are centralized: they are made by administration.

Item N: Purchasing and resource acquisition is corporately regulated and maintained.

Item O: Hiring and placement decisions are corporately regulated.

These five statements indicate that the administration at Hillwood has much influence and control of the role that individuals play within the organization. Hiring decisions are made only at the administrative level and work assignments are made by administrators.

However, once in a position, teachers at Hillwood are given wide latitude to perform the job as best they see fit. Each of the following statements indicating weak grid were overwhelmingly chosen by survey respondents:

Item B: Within your classroom, teaching activities are self-directed.

Item F: Access to existing instructional material and facilities is obtained through individual teacher negotiation.

Item H: Curricular decisions and teaching methodologies are individually negotiated.

While the administration at Hillwood leaves teachers to operate within their roles in a way they determine is best for their classroom, building principals do influence the role teachers and staff play by making all hiring and placement decisions. Overall, 11 respondents selected a total of 88 statements and chose 50 statements in the strong grid category; they chose 38 statements in the weak grid category. The survey would indicate that Hillwood is a strong grid environment.

It is important to note that individuals within an organization will perceive differently the organization when considering the selection of strong

grid/group statements and selection of weak grid/group statements. As such, some members may perceive a strong grid environment and choose the corresponding statement; others may perceive a weak group environment and choose an opposing statement. Frequency counts then fall along a continuum: in some cases the difference between score indicating strong or weak was by only one point. For example, when selecting statements on Item M, six respondents at Hillwood chose *School 'business' flows primarily through individual networks;* its contrasting statement *Item M: School 'business' communication flows through corporately regulated/maintained processes* was chosen by five respondents. It is for this reason and others that the survey cannot be the only data source for judging the grid/group make-up of the organization and that additional data sources such as interviews, observations, and document analysis are considered.

Based upon the survey, Hillwood Junior High School plots out as a Bureaucratic (strong grid, weak group) culture. However, other data collected do not support this finding. Rather, interviews, extensive observation, and document analysis indicate a more Corporate (strong grid, strong group) culture.

In order to understand best the culture at Hillwood Junior High, additional data sources of interviews, observations, and document analysis must be considered along with survey data. What follows is an analysis of those complementary data.

Hillwood JH - Playing field, grid considerations. While Hillwood teachers have access to technology, much of that access is outside their individual classrooms. Computers are placed in laboratory classrooms and teachers must negotiate for those spaces. In each classroom is one computer intended for teacher use. Some teachers' room arrangements reflect this by creating a walled-off space with two desks that is not inviting to students. One teacher has gone so far as to post a sign on the computer behind the desk stating that the computer is for teacher use only. While many rooms do have a traditional overhead projector to be used with water-based markers and either a white board or chalkboard, those are the only options available to teachers on a regular basis in their classroom with regard to presentation materials. This limitation is indicative of a strong grid culture, one that limits individuals' choices.

Though Hillwood looks to place additional computers into laboratory classrooms, the intention is that those computers will run Orchard's math, language arts, and science computer-based curriculum. Also indicated are intentions to allot teachers a weekly time when they can bring students to the lab. This decision to limit the software available and to allot time in the lab rather than allow teachers the ability to determine individual software needs and negotiate for optimum timing in the lab is also indicative of a strong grid environment.

There are other limits on teachers' individual choices with regard to the *playing field* at Hillwood. Building administrators require the use of a computer-based grade book application to report grades. While such a requirement is not itself negative and the benefits of database-driven grade books can quickly outweigh the drawbacks, mandates to use specific software for specific purposes is a limit on individual's choices.

Teachers do have some computer laboratory access and that access is negotiated on an individual basis through the lab manager. This weakens the grid aspect as it adds some individual choices, but it should also be noted that the technology education teacher has priority over the lab and this priority scheduling limits individuals' choices.

Hillwood JH - Players, grid considerations. The amount of control the building principals exert over teachers at Hillwood is an indicator of the strong grid culture at Hillwood. One prime example is in Donna Fairfield's mathematics classroom where Principal Randall Washington had told her not to use calculators. This level of specifying teaching methods is indicative of extremely strong grid influence. Another example is found in a parent volunteering to come into a teacher's classroom to assist with a lesson on digital photography. While the teacher was eager to have the parent's assistance, the teacher did not want to confirm the date and time before she had checked with Mr. Washington

to be certain it was a situation of which he would approve. This too demonstrates the power Mr. Washington has over teachers and the limits placed on their daily activities.

Mr. Washington has also limited Mr. Charles Riverside's powers within the school. While Mr. Riverside is 'in charge' of the Junior High, his role is ascribed to him by Mr. Washington. When entry to the site was requested to do the study, Mr. Washington signed the letter of permission.

Both Mr. Washington and Mr. Riverside have prescribed that teachers at Hillwood use a specific grade book application. The use is required and Mr. Riverside has indicated that such use is an attempt to encourage teacher buy-in to instructional technology use at Hillwood.

There are instances of weak grid culture as well: teachers at Hillwood do not seem to see lines of stratification between various staff members. At any time, teachers may talk to administrators and staff members may talk to teachers. The junior high main office is a place of both professional engagement and socializing. In fact, on one afternoon, both Mr. Washington and Mr. Riverside were absent from the building and the superintendent, Mr. Kinross, came to the main office and enquired of the secretary whether she needed any assistance. She did not . . . indicating that in the absence of the building administrators, others can quickly fill those roles.

There are other instances of teachers filling roles for which they were not hired. In a situation where a teacher/coach was dealing with a lengthy illness of a child, a non-coach teacher was asked to fill in and did so with no coaching expertise.

While there is evidence of some weak grid tendencies, most of the evidence is not related to instructional technology use. The limits placed on individuals with regard to instructional technology use, indicates that Hillwood *players* operate in a strong grid environment.

Hillwood JH - Rules of the game, grid considerations. While the administrators at Hillwood exert strong control over teachers' methodologies and curriculum, they have only mandated the use of technology for reporting grades and attendance. There are not other expectations for technology use at Hillwood Junior High. There are no provisions for the evaluation of technology use in the teacher evaluation instrument. However, Mr. Riverside does indicate that technology use will weigh in on future hiring decisions.

There are also few rules placed on teachers who wish to make use of technology resources within the school site. Granted, the technology education teacher does have priority in scheduling computer lab time, but after that, the lab is available to teachers on a first-come, first-served basis as are the audio/visual materials stored in the school library.

One aspect of grid at Hillwood Junior High is telling: teachers have little negotiation power in the process of acquiring resources for their classroom whether they are technology or non-technology oriented. While Mrs. Hills has some leeway with her Title IX budgets, other teachers fill out a purchase requisition and submit it to the building principal. Mrs. Wellman uses language indicating that the process is unknown to teachers, "see if it will fly . . . " Mr. Riverside describes the process more in-depth and indicates that most large purchase requests are gathered together at the end of the school year and building principals and the district superintendent meet to discuss which requisitions will be funded. Teachers have little say in these budget discussions and the administrators make decisions about what is best for the group without much additional input from the requestors.

In analyzing the *rules* under which teachers operate at Hillwood, there is evidence of both strong grid and weak grid influences.

Hillwood JH - The game, grid considerations. The *game* aspect of Lingenfelter's (1996) model for analyzing social environments examines the common activities around which organizations center themselves. Hillwood teachers want to involve themselves and their students in activities that better prepare students for entry into the career world or for success in collegiate education. Teachers spoke of the need for the integration of technology to assist

in those activities, but one theme that arose from several interviews were the limitations placed upon individuals due to financial constraints at Hillwood. Teachers spoke of knowing of existing technologies that could be used but were unavailable. Donna Fairfield spoke of her frustration, "I see all this cool stuff that I can't afford to get in the classroom for my kids."

Mrs. Fairfield personally feels constrained and believes others in her department are also constrained by the limitations placed upon them by the lack of discretionary funds. She recalled her previous position in a wealthier district and how ample computer access and specific software for mathematics instruction was available. However, at Hillwood, she believes there is a lack of computer laboratory availability and a lack of specialized mathematics software:

> In the math department, there's very little [computer use]. I know that the English teachers . . . use it a lot more. But we don't have the software, because there's no money out there to buy it. We do not have a lab that we can take the kids to.

However, these financial constraints are not as severe at Hillwood noted both Mrs. Fairfield and Mary Brighton, the library media specialists. They indicated that Hillwood is in good overall financial shape, unlike other districts they believe to be close to closing.

Mrs. Brighton knows that Hillwood is going to have to increase its financial commitment to technology in order to both maintain its current infrastructure and increase its available technology:

> It's going to have to be one of those line item things, or one of the things that you're going to expect to spend every year 50 or 60 or 70 thousand dollars on and try to keep moving up.

In a strong grid environment, individuals are limited in the ways they may make decisions. Hillwood places limitations on teachers by creating an environment where teachers believe that there are limited funds available for teachers to spend in acquiring classroom materials.

Hillwood JH - Group Considerations

Hillwood JH - Group questionnaire results. Nine pairs on the survey were designed to elicit responses with regard to the focus and mission of the group. Of the nine, respondents at Hillwood chose five weak group statements and two strong group statements. The five statements that indicate weak group were:

> Item D: The authority structures within your site are decentralized.
>
> Item E: School communication channels are informal.
>
> Item I: Teachers are motivated by self-defined interests.
>
> Item J: Instructional materials and facilities are individually controlled by teachers.

Item K: Within your site, teaching activities are initiated and planned by individual teachers.

The number of respondents selecting each of these statements overwhelmingly pointed to weak group: Of 11 respondents, on items D, E, and K only one respondent chose the opposing strong group statement; on item I, two respondents chose the strong group statement; and on item J, three chose the strong group statement. Teachers at Hillwood, according to survey responses, tend to keep to themselves and keep instructional materials to themselves. They plan classroom activities on an individual basis and do not collaborate with other teachers on classroom projects.

Only two statements of the nine group pairs reflected a preference for strong group culture:

Item L: Authority is corporate with clear accountability to members.

Item Q: Productivity is evaluated according to group-determined goals and priorities.

In these two statements, respondents indicate that, while much of the day-to-day decision-making about classroom activity is left to the individual teacher, teachers will be evaluated through a group-determined instrument. These instruments are traditionally a part of the negotiated master contract between

teachers and districts and changes in the evaluation instrument must be included in the contract bargaining process.

Overall, respondents chose a total of 99 statements and in 68 instances chose weak group statements as opposed to only 31 instances of selecting strong group statements in the survey. This would indicate a weak group environment in Hillwood Junior High School.

As in all other aspects examined so far, survey data cannot be the only data source for understanding culture at Hillwood Junior High. Following are analyses of additional data collected through interviews, observations, and document analysis.

Hillwood JH - Playing field, group considerations. The space in which Hillwood teachers work is important to them. The district recently reorganized when a new high school building was constructed making more room available. Prior to the new building's construction, grades 4 through 12 were housed in the same space now allotted to grades 4 through 9. This allowed teachers who had been doubling up in rooms to move into their own classrooms. It also separated most teachers into two separate groups housed in two distinct facilities, either intermediate/junior high school teachers who remained behind in the older structure or high school teachers who moved out to the new building. This added to the group strength by creating distinct groups who could better

concentrate on fulfilling the schools' missions. There is, however, little evidence that such a major restructuring of the school has taken place. Teachers are still working in essentially the same environs as before; they have more space in which to spread out. Even students do not seem put out that there is a now a junior high *and* an intermediate school where once there was only an intermediate school. That the restructuring has taken place and the group has remained intact and focused on its mission speaks of a very strong group culture.

Also strengthening the group is a shared goal of putting a networked computer and printer on each teacher's desk. While there is some discrepancy regarding whether or not that goal has already been met, it is nonetheless a goal. Such shared goals increase group strength as it gives members of the organization a common mission toward which to work.

Adoption of the Orchard software set of applications for math, science, and language arts may also help increase group strength once the lab is in place and operable. With a common application such as this, teachers may be encouraged to work in collaborative ways exchanging ideas about the software and its usefulness in the classroom. In addition, students may also find themselves banding together around the software. Conversely, if there is little or no teacher acceptance of the software, this too may contribute to group strength as teachers cooperate in attempting to undermine the software's usefulness.

On a larger scale, Hillwood is a strong group culture in other ways. The community is highly supportive of school activities. There is an active parent-teacher organization and large numbers of community members support various school functions. Many of the teachers live in the city of Hillwood or in the district's rural areas. There are instances of mascots painted on the school walls; even the school's floor tiles are laid in an alternating pattern of black and white, the school colors.

Another aspect of strong group is evidence of members placing the needs of the organization above their own. Library media specialist Mary Brighton has set for herself a goal of having the library catalog online and accessible to teachers and students from building computers. Her intentions are that they be able to determine availability of a work from the classroom. While she has already converted the catalog to an electronic medium, she believes it is in the group's best interest that the catalog is made more readily available. This demonstrates a high commitment to the group and a rather large investment of time in the group, both of which are indicative of strong group culture.

Hillwood JH - Players, group considerations. There is ample evidence of a strong group culture among Hillwood's teachers. One of the main indicators is the amount which teachers place the good of the group above their own needs. Mrs. Shelley Hills believes that she must provide weekly grade checks for each of

her students. In the past, she has calculated these by hand with a only a calculator. Now, she uses technology that is available to her to accomplish this. She is pleased with the grade book application, as it has freed up her personal time by cutting the hours needed to figure each student's grade.

Both Mrs. Hills and Mrs. Wellman use a web-based teacher posting application called SchoolNotes.com. Here they easily update an announcement page and make it available to both students and parents via the World Wide Web. While application is fairly fundamental and limited in power, it is nonetheless an indication of the length teachers will go to promote the mission of the group over their own needs. Mrs. Wellman believes in the need for the application even though she is not an eager technology user.

Mrs. Wellman also demonstrates strong group influence by admitting that she uses the electronic grade book as mandated by the administration, even though she may not particularly like doing her grades online. This adherence to expectation is another indicator of strong group at Hillwood.

Mrs. Hills and Mrs. Brighton serve as resource persons for teachers at Hillwood who want to learn new technology skills. Using group members as peer mentors and resident experts is indicative of the level of trust placed in members of the group. However, these informal resources are not the only ways that teachers get training. Though it weakens the group strength, training is also

brought to Hillwood by outside experts. In addition, teachers attend training offsite at the local university and at training opportunities provided by neighboring school districts. This offsite training, though, is the only indicator of a weaker group evident in the *players* at Hillwood.

Donna Fairfield uses offsite training (a weak grid indicator) to promote the needs of the group (a strong group indicator) when she organizes several teachers to attend training sessions together so that they can receive free materials and equipment. Mrs. Hills also contributes to group strength when she uses her Title IX funds to purchase hardware and software that benefits not only her Title IX students but the greater student body as well.

Hillwood's establishing of a technology committee and the committee's creation of a technology plan is a contributor to group strength as well. Mrs. Brighton, as the library media specialist and building technology coordinator serves on this committee along with other library media specialists in the district. That Hillwood has a technology plan and that the technology committee recognizes that the plan is dynamic places Hillwood ahead of many other schools that blindly try to face the challenges of technology without a mission written in the form of a technology plan.

Finally, it was noted by a parent of a junior high school athlete that junior high school teachers often travel together to out of town athletic events. While

these may be quasi-professional duties (they act as pseudo-crowd controllers), they are as well social events. When members of a group interact with each other both professionally and socially, there is great strength in the group.

Hillwood teachers often put the needs of the group above their own personal needs, they work in concert toward a common mission providing informal and formal assistance to each other to the levels of their expertise, and they value both the professional and social relationships they establish within the group. These indicate a strong group culture at Hillwood Junior High School.

Hillwood JH - Rules of the game, group considerations. Three pieces of evidence point to the influence of strong group in the *rules* at Hillwood Junior High. Both Mrs. Hills and Mrs. Brighton serve as resources for instructional technology improvement within the site. Lingenfelter's (1996) definition of *rules of the game* centers around the relationships that individuals within the group establish. That members of the group look to their own for guidance and advice in regards to instructional technology is a testament to the level of trust they place in their own members to provide them what they need to be successful with instructional technology.

Secondly, group members valuing group survival over their own needs and making strong commitments to the success of the group is indicative of a strong group culture. Mrs. Brighton gives of her own time during her lunch hour

to sell cotton candy at the school in order to provide funds to purchase additional instructional technology not funded through regular budgetary channels.

Finally, even though building administrators and the superintendent make most decisions about large ticket purchases, their reasons for doing so are grounded in wanting to do the most good for the district with the limited funds they have available. In essence, they are taking upon themselves the responsibility for meeting the overarching needs of the group by limiting individual negotiation between administration and teacher so that they can make the most objective decision about the greater needs of the group.

Hillwood JH - The game, group considerations. It is here that Hillwood demonstrates a weak group: the hiring of HelpMySchool.net indicates that, in spite of a technology committee that has developed a dynamic technology plan, there is a need for outside consultants to bring to the group expertise that the administration does not believe exists within the staff at Hillwood. A strong group establishes clear membership rules and works to keep outsiders at bay. In hiring an outside consulting firm to make decisions about instructional technology for Hillwood, the administration has acted contrary to the culture evident at Hillwood.

HelpMySchool.net's vision is simple:

> to assist each school district in building its technology program not based on what is available, but rather what is needed to accomplish the goal of educating our youth in the current and future technologies of the world (HelpMySchool.NETwork, 2003).

It is helpful to note that HelpMySchool.net is a commercial firm with an identified set of vendors with whom they do business exclusively.

Administrators at Hillwood are demonstrating both weak group and strong group in their contracting with HelpMySchool.net: to bring in outside consultants is a weak grid indicator; yet, the researcher believes that the administration truly has the best intentions in their contracting with the consulting company and have the best interests of the group in mind. They have established a goal of improving the technology infrastructure at Hillwood and have determined that HelpMySchool.net is the best avenue to accomplish this end.

While Hillwood has contracted with an outside organization to assist in making instructional technology decisions, the culture at Hillwood is decidedly strong group: teachers are focused on creating and maintaining strong relationships within the school, even to the point of assisting with each other's workload on a long-term basis and socializing outside the school day.

Hillwood JH - Grid and Group Summary

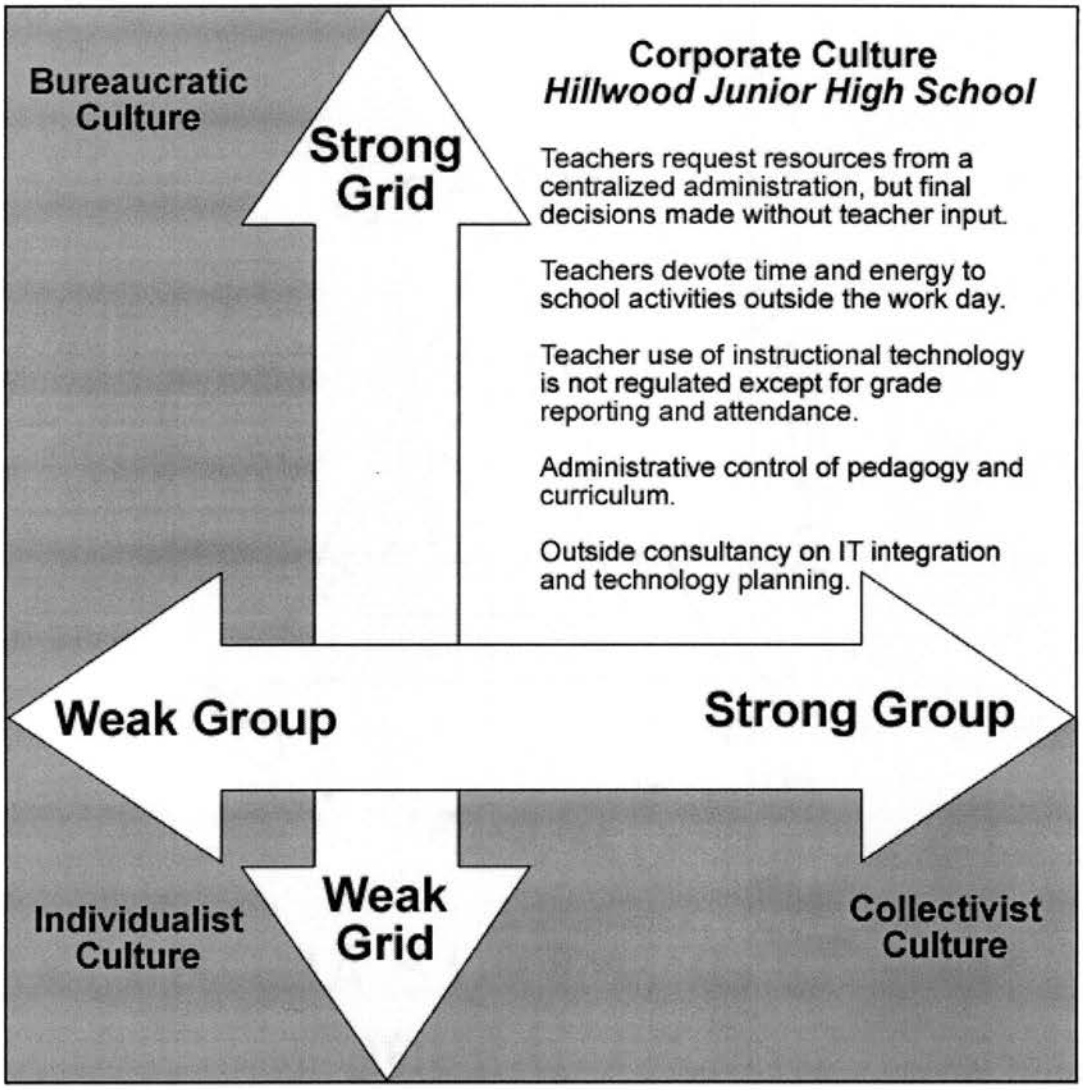
The strength of both the grid and group aspects of Hillwood Junior High are evident in the way that rules have been established under which members must operate. While there are indications of weakening of both grid and group, these are minor influences on the overall culture. In general, members enjoy the group to which they belong and identify strongly with that group. They are quick to sacrifice their own needs for the better good of the group by volunteering their time to help when that help is needed by the school.

Additionally, the administration at Hillwood may impose a number of the rules under which members operate, but at the same time, they are establishing these rules for the good of the group. They have the mission of Hillwood Junior High in mind when they work to spend limited funds so that the most good can come from the few dollars they have to spend.

Douglas (1982) calls a strong grid, strong group culture Corporate. Figure Three illustrates the grid/group typology of specific Hillwood Junior High characteristics.

Figure 3

Hillwood Junior High School's Grid/Group Typology



Comparison and Contrast of the Cases

Both schools work at providing a quality education for their students; however, the differences in teacher autonomy, existent resources, access to funds for new resources, and group relationships are apparent. These schools represent two different cultures as described by Douglas' (1982) grid and group typology (*Figure 2* and *Figure 3*): Maple Grove Middle School is an Individualist culture; Hillwood Junior High is a Corporate culture.

Harris (in press) characterized the Individualist culture:

> In Individualist . . . environments, relationships and experiences of the individual are not constrained by imposed formal rules or traditions. Role status and rewards are competitive and are contingent upon existing, temporal standards.
>
> The emphasis on social distinction among individuals is submerged, there are few insider-outsider screens, and little value is placed on long-term corporate survival. The predominant social game in this environment is "Individualism," which encourages members to make the most of individual opportunities, seek risks that result in personal gain, and be competitive and proactive in carving their future in life. (n.p.)

In the Individualist culture, the rights and roles of the individual are valued over the needs of the group. The administration of a school in the

Individualist typology has set as its priorities providing an environment where teachers have the tools they need and are encouraged to make the best decisions for their students. Individualist culture administrators believe their teachers are the best decision makers, as they have the most knowledge of their students.

In contrast, Hillwood Junior High School is best described as a Corporate (strong grid, strong group) culture. Harris (in press) provided description of the Corporate culture:

> In Corporate (high-grid, high-group) contexts, social relationships and experiences are influenced by boundaries maintained by the group against outsiders. Individual identification is heavily derived from group membership. Individual behavior is subject to controls exercised in the name of the group. Roles are hierarchical; at the top of the hierarchy, roles have unique value and power (generally limited to a small number of experts).
>
> There are many role distinctions at the middle and bottom rungs. Perpetuation of traditions and group survival are of utmost importance. . . . Central office administration, site administration, teachers, students, and parents work in a cohesive, integrated system for the benefit of all involved. All share in the opportunities, risks, and future of the school. (n.p.)

One implication of the Corporate environment described above is that the individuals comprising the group work diligently to promote the group for the good of all members. Administrators make decisions that they believe are in the best interest of the group and maintain a level of hierarchy so that they control the bigger picture that only they can see from their perspective at the top of the order. Members of the group band together to form alliances that also promote the group as a whole, but rely on administrators to make overarching decisions that affect the group.

Maple Grove MS - Playing Field

Maple Grove Middle School presents a weak grid, weak group playing field where teachers have access to a wide variety of tools with which to perform their job function and integrate technology into the curriculum. Resources are abundant, but there are few rules regarding use of the resources with the exception of a proscribed application for reporting grades and attendance. Technology support has been concentrated into one facility and those facilities are staffed by two full-time technology coordinators, one mainly responsible for Macintosh operating system computers, and one responsible for Windows operating system computers. Maple Grove has deployed a wireless network designed to facilitate online access to all parts of the campus. Computing technology is available to all grade levels and its use is evidenced from

Kindergarten through grade 12. The staff at Maple Grove is disparate, as most live out of district and do not establish social ties with other teachers outside of school.

Hillwood JH - Playing Field

Hillwood's playing field is in the strong grid, strong group typology. The school has decided on a single software package to provide curriculum enrichment for mathematics, science, and language arts, and access to those enrichment opportunities will be allocated on a weekly basis. Other technology deployed throughout the building is limited to a single computer on most teachers' desks with a goal of seeing one on every teacher's desk as soon as funds are available. Teachers are required to file grades via an online electronic resource; attendance is emailed to the school secretary hourly. There is a strong sense of *family* among Hillwood's teachers: they live within the district and socialize with each other, even traveling to out of town school functions together on occasion.

Maple Grove MS - Players

The description of the players at Maple Grove revealed a weak grid, weak group environment. There are few rules that teachers must follow, and the lines of communication to both building principal and the superintendent are easily accessible. Classroom decisions are made by individual teachers in accordance

with what they believe is best for their classrooms. Administrators do not push the use of technology except to require electronic grade and attendance reporting. In addition, the extensive technology resources available to teachers allow them many opportunities to make individual decisions about which technology they wish to integrate into their classes. There are no struggles to access the technology as either classroom sets of computers abound or, in the upper grades, students each have a personal laptop provided by the school. A new superintendent has decreased the school's focus on instructional technology, but has not yet withdrawn financial support for the existing infrastructure. The weekly schedule has been changed eliminating Friday afternoon professional development, and some teachers indicated that such a move has been detrimental to their continued technology development.

Hillwood JH - Players

Hillwood features a strong grid, strong group environment surrounding the players. The life of the school revolves around the school's main office that serves as both a professional and social meeting place. Teachers are very willing to go above and beyond contractual expectations to provide materials for their classrooms, spending their own money or spearheading fund-raising events to purchase technology they believe is necessary. They draw upon both formal and informal training opportunities taking coursework from the local university or

attending conferences outside the district. They also rely upon the more experienced technology users on the staff to serve as resources for technology assistance, especially with the administratively mandated grade book application. Administrative power at Hillwood is centralized in the principal and assistant principal. The power of the assistant principal is 'given' to him by the principal. The principal exerts strong influence over teachers' classroom decisions so that many simple choices must be cleared through him prior to implementing any change in pedagogy or curriculum.

Maple Grove MS - Rules of the Game

The rules of the game for both schools centered on the availability of funds and how those funds are acquired by teachers. In Maple Grove's weak grid, weak group environment, teachers are allowed to approach either the building principal or the superintendent and request new materials or hardware and in all likelihood have the purchase approved and delivered in a timely manner. No indication has been made to teachers that they make requisitions in excess of available funds; in fact, comments made indicate that teachers may sometimes request more resources than are needed.

Hillwood JH - Rules of the Game

Hillwood teachers operating under strong grid, strong group rules must channel requisitions through the building principal who either approves or

disapproves the purchase. For big-ticket items, the principal meets with other principals and the superintendent to determine the best course of action and whether or not the purchase is of sufficient merit to the school community to warrant placing the order. Teachers have indicated that they have even taken to hosting fundraising events to solicit funds to make purchases for their classroom or spend personal funds to make such purchases.

Maple Grove MS - The Game

The game was evident in each of the schools. At Maple Grove, a weak grid, weak group school, the most noticeable change in the structure of the school is the departure of long-time superintendent Robert Fayette and the arrival of novice superintendent Anne Waverly. This changing of lead administrator has caused an unusual amount of relaxation among teachers at Maple Grove as the new superintendent is less inclined to promote technology use at levels previously established by Mr. Fayette. Some teachers have welcomed this easing of pressure to use technology; others are disappointed, but continue to use technology at previous levels as the infrastructure continues to be fully funded and supported. There is evidence of strength of group at Maple Grove as all grades in the school are using technology at some level. In addition, the building principal is operating under the belief that a teacher at Maple Grove cannot survive if the teacher does not use technology.

Hillwood JH - The Game

Like Maple Grove, one particular phenomenon influences the game in play. While Hillwood Schools is, for the most part, a strong group school in the Douglas (1982) typology, in this portion of the analysis, Hillwood is a weak group environment as the district recently contracted with an outside consulting firm to provide technology infrastructure planning. HelpMySchools.net's mission is to provide a plan for acquiring necessary technology resources based upon their survey of existing district technology infrastructure. It is interesting to note that the vision of HelpMySchools.net is to provide solutions based upon perceived technology needs, rather than on existing technology. A commercial firm, HelpMySchools.net provides a list of vendors that they tout as having met strict requirements for providing goods and services to HelpMySchools.net clients. This lack of the district's confidence in its own technology committee and technology plan is indicative of a weak group culture.

Chapter Summary

The typologies associated with Maple Grove Middle School and Hillwood Junior High are evident and can be seen in a variety of ways. Maple Grove is an affluent organization with a wide variety of instructional technology available for members to draw upon while Hillwood continues to work diligently and carefully to create a playing field that will provide more and more opportunities

for its teachers. At Maple Grove, players enjoy freedom to make decisions about day-to-day classroom activities without pressures from the building principal or district administration; conversely, Hillwood principals exert strong influence over the members of the group on pedagogy and curriculum. There are few rules at Maple Grove where Hillwood teachers have distinct rules and limitations on choices. Maple Grove is an instructional technology-rich environment and those tools are used in a wide variety of ways, whereas Hillwood has limited instructional technology tools and many of the uses of those tools are regulated by the administration.

The grid and group typology was useful in describing the organizational culture in both of the school sites, and the typology was broad enough to encompass the variety of social interactions and contexts surrounding instructional technology use. In the next chapter, implications and a further description of its use will be presented.

CHAPTER VI

RESULTS AND RECOMMENDATIONS

Summary of the Study

Schools like Maple Grove and Hillwood have increased the amount of technology available to teachers, assisted in increasing teachers' familiarity with technology through training, and supported and encouraged the use of technology through administrative directives. In spite of these efforts to increase the use of instructional technology, some teachers are not using instructional technology or use them only at minimal levels as prescribed by administrators.

Why do a small number of teachers embrace change and demonstrate high-level competence and integration of instructional technology while other teachers adamantly refuse to adopt or even experiment with technology?

In an attempt to answer this question, this study employed the lens of Mary Douglas' (1982) grid and group typology as a framework and vocabulary to examine teachers' use of instructional technology in two Midwestern school sites. Specifically, the study looked at:

1. How instructional technology is used in classrooms in each of the selected schools;
2. Ways in which the use of instructional technology reflect grid/group realities in each of the selected schools;
3. Other realities as revealed in each of the selected schools; and
4. Whether grid and group typology was helpful in understanding differences in teachers' instructional technology use in the selected schools.

The schools selected for the case study and analysis were a middle school and a junior high school in rural towns located in a Midwestern state. The schools were selected based on Stake's (1995) assertion that the sites be easily accessible by the researcher and be welcoming of the intrusion of the researcher into the site. Additionally, the two schools were chosen through purposive sampling (Stake, 1995) because both exhibited some use of instructional technology by teachers in the schools and were different in demographics, financial strength, and technology emphasis across the school site.

Data collection occurred using a variety of methods including interviews, observations, document analysis, and a brief questionnaire. The purpose of the data was to provide for a description of teacher use of instructional technology

within the school site and to understand the school's organizational culture within which that instructional technology use occurred.

Data collection occurred over a period of months beginning in October 2003 and ending in March 2004; data analysis was ongoing throughout the study. Through multiple interviews, documents, observation, discussion with academic advisors and peers, member checks from participants in the study, and the use of a forced-choice pair survey, triangulation of the data was realized.

Summary of the Findings

Maple Grove, an Individualist (weak grid, weak group) culture, is a school where teachers enjoy a high degree of autonomy and the freedom to make decisions about their classrooms as they see fit. Teachers have access to nearly any piece of instructional technology they need and are able to negotiate acquisition for those items they do not have. A modified schedule previously allowed teachers the opportunity to have extended time on Friday afternoons each week for professional development usually centered around instructional technology integration or training on new technology acquired by the school; however during the current school year, that practice has been abandoned for a more traditional school schedule. Finally, a recent change in superintendents has caused a shift in focus that does not emphasize the use of instructional

technology that has pleased some members of the faculty and disappointed others.

Hillwood Junior High School's teachers operate in a Corporate (strong grid, strong group) culture where the school administration has established a set of rules and roles to be followed in the classroom. Decisions about changes in classroom teaching strategies are approved by the administration. Teachers at Hillwood are willing to forgo their personal needs for the needs of the school: they cover each other's extended absences, they collaboratively raise funds for classroom materials, and they serve as peer resources for others in the school setting. They do not have ready access to instructional technology and do not enjoy an ability to negotiate easily for acquisition of new resources. Decisions about instructional technology purchases are made at the administrative level and administrators do not often ask for input from teachers on purchasing decisions.

Conclusions

The following research questions guided this study and are discussed below.

How is instructional technology used in classrooms in each of the selected schools? Maple Grove is a technology-rich environment that encourages teachers to make decisions about instructional technology as best they see fit for their

individual classes. Administrators support the use of technology at Maple Grove and support teachers' efforts to integrate instructional technology into their teaching.

Uses of instructional technology at Maple Grove ranged from simple document word processing and information retrieval from the World Wide Web via the Internet to more advanced uses of applications such as Microsoft PowerPoint, Excel, and Access. There is evidence of students producing HTML-based content for the World Wide Web, and uses of digital still photography and digital video production. Teachers' use of instructional technology also ranged across a wide variety of application including all those previously mentioned. In addition, teachers use *PowerSchool* as a student information management system for reporting grades and attendance. Parents and students can access *PowerSchool* to keep up-to-date on student progress. Teachers also provide web-based information sources to keep parents and students informed of classroom events, assignments, and other school happenings.

Teachers and administrators at Maple Grove also spoke of instructional technology as being an important part of the curriculum and a part of the school's mission, and they discussed how instructional technology is part of the world outside of Maple Grove that students are being prepared to enter. Mr. Randalia, the principal, hoped that technology might provide some motivation to

a group of students who have little in their personal lives to motivate them and few role models to push them to greater achievements outside of Maple Grove. In this way, technology is a liberating tool that serves to give students access to a world beyond Maple Grove.

Maple Grove may take on this mission because individuals in the district in the past have envisioned that technology might serve this role. Mr. Fayette, the former superintendent, put in place the infrastructure to support this mission and laid the foundation for maintaining the infrastructure. For many years to come, Maple Grove will not need to plan for funding the infrastructure; but they will need to envision ways to encourage additional use of instructional technology. However, that direction will need to be in keeping with the Individualist organizational culture already in place at Maple Grove. If there is not an effort to provide continuing training and motivation to teachers at Maple Grove in the areas of instructional technology integration, there will be less and less use of technology.

Hillwood Junior High School presents a technology environment that is much less advanced than the environment evidenced at Maple Grove. Teachers have a single computer in their classroom, but many of them are older model computers with slow processors and operating systems as old as *Windows 95* and *Windows 98*. Teachers at Hillwood are at times envious of other schools that have

better instructional technology tools and are sometimes frustrated with the lack of tools available to them.

Instructional technology use at Hillwood is limited. Teachers are required to submit grades electronically and email hourly attendance records to the school secretary. They also use instructional technology to prepare curriculum materials such as worksheets, handouts, quizzes, and tests. On occasion, they may schedule time in the computer lab for student word processing or Internet searching via the World Wide Web. But for many teachers, 'computers' is another subject in the curriculum taught by the 'computer teacher', and they do not see ways in which they might integrate into their teaching the instructional technology already in place in the school.

Student use of technology is severely limited to the point that some teacher computers are physically labeled "Teacher Use Only!" For many, the use of a computer during the school day is a reward for good behavior. Occasional lab use is evident, but even that is seen as a reward as revocation of the privilege is threatened as a consequence of bad behavior.

Teachers have indicated that one of the reasons for a lack of integration of instructional technology is the lack of access to hardware. Hillwood administration is focusing attention on this aspect by hiring an outside consulting firm to evaluate technology in the district and assist in creating a plan

for reshaping the instructional technology landscape in the district. It will be important for Hillwood's success that in addition to investing in hardware and software, they also invest in training and mentoring for teachers. This training and mentoring will need to be rather basic at the outset, beginning with fundamental operations, as new technology added to the district will be unlike existent technology. However, the researcher thinks there is an environment in place at Hillwood that will encourage the adoption and integration of instructional technology. As a strong group culture, Hillwood has demonstrated commitment to mission of the group and already has in place the support structures needed for more advanced instructional technology users to mentor those less proficient. Once Hillwood makes the planned substantial investment in technology infrastructure, they must draw upon the strong group culture to make best use of the technology.

In what ways does the use of instructional technology reflect grid/group realities in each of the selected schools? Maple Grove's Individualist (weak grid, weak group) culture is evidenced by its instructional technology use. In an Individualist culture, individuals are afforded much leeway in making decision and there is less emphasis on the contributions to or maintenance of the group as a whole.

Teachers at Maple Grove are allowed to make decisions about instructional technology integration without pressure from district- or building-level administrators. In only one way are teachers expected to use technology in their work: the required use of *PowerSchool* as a student information management system. Weak grid indicates much individual choice, and teachers evidence this. Some teachers make extensive use of instructional technology in their classes even to the point that they admit having a difficult time envisioning themselves teaching without instructional technology or even with reduced access. Other teachers use instructional technology only to the levels required by the administration. In addition, administrators encourage instructional technology use by providing the necessary tools and allow teachers to negotiate individually for additional hardware and software as these needs become apparent to each individual.

Throughout Maple Grove Middle School, other evidence of individuation is apparent. Students are given access to extensive hardware and software tools on an as needed basis. They are allowed to take computers home if a need is shown and are allowed to use building computing facilities unsupervised. Teachers at Maple Grove take on a variety of roles, both ascribed and assumed. Some teachers act as peer mentors to other teachers in the process of integrating instructional technology, and technology support personnel roles have changed

over time as needs of the school have evolved. Teachers also realize a relaxed emphasis on instructional technology at Maple Grove with the change in district administration.

Maple Grove Middle School's teachers' use of instructional technology also demonstrates the weak group aspect of an Individualist culture. In such a culture, members of the group do not place emphasis on the continuation of the group, nor is there emphasis on the creation of relationships within the group. Members do not draw their identity from the group and are able to disconnect from the group outside the group's immediate environs. The group is not withdrawn from outsiders. There are few collaborative efforts underway at Maple Grove. Teachers do not work in teams and do not plan lessons in concert with one another. Staff members live outside the district and do not interact socially outside the school day. The school is open to outsiders and has been since it has emerged as a leader in instructional technology use. In fact, former employees spoke of the "daily tour" by outsiders of Maple Grove's facilities.

There is less emphasis on creating an atmosphere of instructional technology integration at Maple Grove. In the past, the school district adopted a modified schedule that allowed students to be dismissed at midday on Friday and provided a block of time for teacher training in new technologies and planning for instructional technology integration. Technology support personnel

cite this loss of dedicated instructional technology training and planning time as a major contributing factor in the deemphasizing of instructional technology use at Maple Grove.

Finally, there is no sense at Maple Grove among administrators or teachers that the deemphasizing of instructional technology integration is problematic. While some teachers and technology support personnel bemoaned the loss of Friday afternoons and the block of time it afforded them, no one spoke of disappointment that facilities went unused or that some teachers did not use instructional technology as extensively as other teachers did.

Maple Grove's use of instructional technology is evidence of its Individualist cultures: much flexibility in how individual's acquire and use instructional technology and little emphasis on creating a group culture of instructional technology-using teachers.

Hillwood Junior High School's Corporate (strong grid, strong group) culture is also evidenced by the use of instructional technology, but not as clearly as Maple Grove. In a Corporate environment, there is a distinct set of rules by which individuals must operate and each individual plays a distinct role in the organization. Additionally, there is a strong sense of group among the members to the point where members work at creating sense of group identity.

Hillwood teachers are limited in the choices they may make about instructional technology integration in that there are not extensive resources available to them, and the building principal exerts strong influence over curricular matters. While the school has set a goal of placing on each teacher's desk a computer and printer, those existent computers are out-dated in both computing power and operating system. There exists a single computer laboratory that is prioritized to the technology education teacher and other teachers are allowed entry only when it does not conflict with that schedule. In addition, there is a mobile computer lab consisting of 14 laptop computers, but that resource does not see much use by classroom teachers. Future plans indicate the addition of computer laboratory facilities beyond the current facilities, yet access will be allocated on a weekly basis, and there are plans to install a pre-determined curriculum on the computers. Such allocation of resources and decision-making on the part of administrators limits the ways in which teachers may integrate instructional technology. Teachers are required by the administration to utilize technology in reporting grades and reporting attendance.

Evidence points to a need to discuss with the building principal any planned innovations in curriculum even to the point that classroom volunteers should be cleared by the building principal prior to their service in the

classroom. Teachers have been directed in which ways they may integrate instructional technology in their classes and have also been directed in which ways they may not: mathematics teachers may not use calculators in their teaching. The building principal cites as his reason that students are not allowed to use calculators on standardized tests used by the school, and he does not wish them to become dependent upon them for doing mathematics problems.

Teachers also have little choice in negotiating for additional resources. Acquisition of resources is controlled by the administrative team consisting of the district superintendent and building principals. This team accepts purchase requisitions and generally holds them until the start of the next budget year in order to be certain that requests meet the needs of the maximum number of students. Even though teachers may feel a need for a particular purchase, they are limited only to requesting the resource and then awaiting administrative approval that may be delayed until the start of the next year.

There is evidence of the strong group aspect of a Corporate culture at Hillwood as well. In a strong group culture, there is evidence of group members dedicated to the mission of the group. Members of the group develop relationships outside the immediate environs of the group, relationships that extend to their personal lives as well.

Teachers at Hillwood live in the district and actively participate in school life beyond the classroom. They have taken on each other's duties in the event of long-term illness, and they attend school events as social outings. The school office is both a professional and a social gathering place. They depend upon each other for assistance with instructional technology integration and band together to attend training off-site to maximize the return on such training, especially if attendance means additional resources be given to the school. Teachers even give of their personal time in order to raise funds to purchase resources that might not otherwise be available through traditional means. A strong parent organization has donated funds for purchases as well. Prior to moving to their current physical space, teachers at Hillwood were required to share classrooms and classroom resources.

What other realities were revealed in each of the selected schools? Leadership is an integral part of any organization and especially important in determining an organization's use of instructional technology. In each of the two typologies discovered in this study, leadership styles are different. Both Maple Grove Middle School and Hillwood Junior High School have recently undergone dramatic leadership changes in some fashion. Maple Grove's *lasses-faire* leadership by the building administration is fundamental in its Individualist (strong grid, strong group) organizational culture. Mr. Randalia, the principal,

allows teachers to operate their classrooms as they see fit, using instructional technology in ways with which they are most comfortable, with the exception of the requirement to use technology for grade and attendance reporting. For him to begin to issue directives for instructional technology use would not complement the existing organizational culture. Maple Grove is also adjusting to a new district administration with a shifting emphasis in the role instructional technology plays. The former superintendent was emphatic in his instructional technology integration expectations even including technology use as part of the standard teacher evaluation. While the technology portion of the evaluation was removed prior to the current superintendent's arrival, she nonetheless has indicated to teachers that she will not be emphasizing the use of instructional technology as her predecessor.

Hillwood is coming to terms with a change in physical plant facilities and in a restructuring of administration at the building level. Both of these situations present issues of leadership: a reorganized physical plant means that teachers each have their own classroom and no longer need share resources, but it also means that additional resources must be acquired to meet the goal of placing a computer on every teacher's desk. Teachers in the current junior high had worked under the direct supervision of Mr. Randall Washington in the former intermediate school configuration. The separation of the school into two entities,

an intermediate school of grades 4-6 and a junior high of grades 7-9, has placed junior high teachers under the direct supervision of Mr. Charles Riverside, though Mr. Washington is technically still the principal of record of Hillwood Junior High, and he and Mr. Riverside work in concert to make decisions that they believe are best for Hillwood's students.

There are teachers at Maple Grove who have access to extensive instructional technology resources and make little use of those resources. Likewise, there are teachers who do make use of the instructional technology available to them. Conversely, at Hillwood, there is evidence of teachers with few instructional technology resources who work diligently to use what few tools are available to them as they feel it is their duty to do so, and there are teachers who are content to use instructional technology only at the levels required by the administration.

Teachers at both Maple Grove and Hillwood are neither rewarded nor punished for their use or non-use of instructional technology. The motivation to use instructional technology and the rewards that accompany its use are intrinsic. Teachers use instructional technology because they believe they should and they believe there are benefits attached to doing so; others choose not to use instructional technology. In either case, the administration neither encourages nor discourages instructional technology use.

Was grid/group helpful in understanding differences in teachers' instructional technology use in the selected schools? Douglas (1989) described the use of the grid/group typology: "The most interesting questions [grid/group] is designed to answer are about attitudes, values, and established thought patterns which correlate with particular grid/group positions" (p. 175). Douglas's typology provided a vocabulary with which to discuss the organizational culture of each school and to describe instructional technology use within that culture. Information from interviews, observations, and document analysis contributed to an understanding of teachers' attitudes, values, and established thought patterns, and data helped establish a position within the typology for each school. However, it is critical to note that the typology is not one of absolutes; rather, each axis of the typology serve as a continuum along which a determination is made by the researcher as to the strength or weakness of the organization under study. In addition, since the combination of two axes represents a wide range of possibilities, it was difficult at times to place each school definitively on each axis. Certain aspects discovered at each school indicated both strong and weak grid and group elements; a determination had to be made as to which outweighed the other.

The availability of a vocabulary with which to describe both the organizational culture of each school and instructional technology use among its

members was useful. Douglas's typology allowed for discussion of both individual choice and the relationships created by individuals. In addition, the typology allowed for a differentiation between Maple Grove's wide range of choices and few restrictions placed on them by administration and Hillwood's narrow set of choices restricted by the limited instructional technology available to them and the strong emphasis on being a part of an established group evident at Hillwood.

The typology was useful in helping to understand differences in instructional technology use by teachers at Maple Grove Middle School and Hillwood Junior High School.

Implications of the Study

The findings of this study have implications in the areas of teacher preparation, administrator preparation, and technology integration. This study also reveals implications for effective instructional technology implementation in both of the settings studied, Maple Grove Middle School and Hillwood Junior High School.

Teacher preparation. When individuals within organizations recognize and better understand the inherent culture within their organizations, they are better prepared to operate in that culture. Pre-service teachers often have idealistic impressions of what it means to be a teacher, to teach, and to work at a school as

a teacher and teacher education programs do little to dispel those notions. In addition, some teacher education programs have recently begun to emphasize the use of instructional technology and are incorporating instructional technology coursework into the pre-service teacher curriculum. In doing so, teacher education programs are giving teachers knowledge of the tools available to them but are not preparing them to operate in schools with severely limited instructional technology resources. Nor is there much in the teacher education curriculum that focuses on helping pre-service teachers understand the various organizational cultures existent in public schools today and how they may negotiate their way through those organizational cultures.

Using the framework of grid and group and the knowledge of how organizational culture affects the way teachers operate at a school, teacher preparation programs can prepare pre-service teachers to examine organizational culture, be cognizant of its importance in the school site, and negotiate and make decisions within known organizational cultures. In addition, pre-service teachers who have knowledge of organizational culture will have strategies for operating within organizational cultures by adapting to rather than fighting against the already established organizational culture in a school.

Administrator preparation. Administrators benefit from this study by realizing that decisions about instructional technology integration (in fact, all

administrative decisions) must occur within the context of existing organizational cultures within their school sites. Purkey (1992) discusses the implementation of invitational education as a way to establish a school culture that encourages student achievement. Purkey's theory is that a climate of invitation is more conducive to learning than a climate where students do not feel welcome. His theory's theme is similar to themes emergent in organizational culture studies: understand the relationship of people and the environment in which they are placed and decisions are made more in keeping with those relationships. Administrators who fail to see this connection will be less successful in effecting school transformation. Specifically applying Douglas' (1982) grid and group typology to administrative decision-making, administrators in Individualist (weak grid, weak group) cultures who try to mandate integration of technology on their teachers with the imposition of rules and regulations will find themselves stymied by resistance from teachers to administrative mandates that have not been a part of the culture in the past. Likewise, administrators in Corporate (strong grid, strong group) cultures will need to establish expectations for instructional technology use that are clearly understood by teachers as such explicit rules are evident in other parts of the culture. It is contradictory to the Corporate typology for administrators to establish rules and expectations in many areas of the organization, but adopt a

lax attitude about instructional technology integration and expect it will occur successfully. Teachers in a strong grid, strong group environment expect clear communication of expectations and are most comfortable when they know what is expected of them.

Administrator preparation programs should incorporate the study of culture as a part of the preparation process. "School leaders who are insensitive to the culture of the school are unlikely to have the knowledge and skills to intervene and may also be negatively disposed toward intervention" (Cavanagh & Dellar, 1998, n.p.). Culture studies will help those wishing to become better administrators by providing them these skills and knowledge. Decision-making must be done within the context of the culture of the organization and not in contradiction to it.

Technology integration. Since organizational culture plays such an important role in the daily life of schools, schools wanting to move toward greater integration of technology must develop strategies for introducing and promoting integration that complement the culture rather than contradict it. Included in these strategies are teacher professional development activities in the form of training opportunities, both in-house and off-site, to develop skills in instructional technology operation and in meaningful uses of instructional technology; dedicated technology support personnel who have both instructional

technology expertise and classroom teaching experience to assist teachers in the process of integrating instructional technology into their teaching; and adequate planning time for teachers to develop new lessons or recast previous lessons with an eye toward technology integration.

These strategies must be implemented in such a way as to complement the existing organizational structure. Organizations where leadership is strong and individuals expect directives from administration must continue that model, providing adequate direction and support for instructional technology integration. Conversely, organizations where individuals operate under less stringent leadership and individuals are accustomed to making decisions on their own must encourage technology integration but not do so in such a way as to direct its use. The organizational culture does not support such directives and would be out of character according to the existing organizational culture.

Implications for Maple Grove Middle School Maple Grove Middle School's instructional technology implementation process is centered around providing whatever instructional technology resources are required by individual teachers when the teachers feel they need them, a paradigm that fits with their organizational culture of Individualist (weak grid/weak group). This has created an environment where teachers are allowed to make instructional technology

decisions on their own, knowing that whatever needs they encounter or whatever problems they face, the resources are available to assist them.

For continued effective instructional technology implementation, Maple Grove would benefit from the re-introduction of the modified schedule that provided time on Friday afternoons for technology training. However, in keeping with the Individualist organizational culture, how this time is spent on Friday afternoon is best conducted in a manner that meets a variety of individual needs. Training sessions can still be offered, but should be done so on an individual, as-needed basis or in small group sessions rather than in large, all-faculty training sessions. This will allow teachers to continue to operate within the Individualist culture while increasing the effectiveness of already available resources.

Maple Grove should also continue to provide resources to teachers on an as-needed basis allowing teachers to determine their individual needs and negotiating for fulfillment of those needs independently of other teachers or programs. Instructional technology support personnel should continue to purchase resources that benefit a large number of people at Maple Grove and continue to make these resources available. However, they must allow teachers to make use of the resources at times and in ways that are specific to unique classroom situations, rather than requiring that the entire teaching staff and

every program use identical instructional technology tools. This way, teachers retain the decision-making freedom that is inherent in the Individualist organizational culture.

Implications for Hillwood Junior High School The instructional technology implementation process at Hillwood Junior High School is in its infancy. As implementation efforts grow, a match between the Corporate (strong grid, strong group) organizational culture evident at the school and these efforts is critical. Hillwood teachers work under a set of expectations outlined by the administration, but teachers lack that set of expectations for instructional technology implementation. While they are expected to use the electronic grade book and report attendance electronically, there are few other expectations for instructional technology use.

In order for instructional technology use to increase at Hillwood, the administration should establish a distinct set of criteria for teacher use of instructional technology. Without such mandates, teachers are unsure of how they should be approaching instructional technology integration in their classrooms. In addition, an evaluation instrument that states these expectations would be appropriate to use because of the existing organizational culture.

As Hillwood further develops a relationship with HelpMySchool.Net, consultants with the firm should be made aware of the organizational culture

evident at Hillwood and charged with working within that culture. While Hillwood may not have the expertise on staff to make the decisions about technology infrastructure that must be made, there is a strong sense of group at Hillwood and HelpMySchool must operate within that culture, working to establish themselves as members of the group. Once that relationship is established, HelpMySchool and the staff at Hillwood can jointly develop a plan for technology infrastructure upgrades that best meet the needs of Hillwood's teachers. If HelpMySchool does not establish that relationship, they will be looked upon as an outsider invading the school and their recommendations stand little chance of being embraced by the staff.

Implications for Similar Organizations. This study is limited to two schools, and this is one of the limitations of case study research: time and effort are devoted to one or two sites that yield a depth of information, but it is information that cannot be generalized to other settings. However, this researcher has examined a number of studies about Douglas' (1982) grid and group typology and studies using the typology as a framework. In these studies, themes emerge that should be noted. Especially evident is that the typology is a useful tool for examining a wide variety of phenomena in socially constructed environments. In order to function within any organization, either as a leader of the organization or a member within its ranks, an understanding of the organizational culture is

necessary in order to make decisions in keeping with the existent culture. Group members who fail to recognize an established organizational culture may well operate within its boundaries by happenstance. A firm understanding of the organizational culture, however, will leverage the organizational culture for successful implementation of decisions.

This knowledge is helpful to the two settings studied and others who read the study and find similarities between their organization and its efforts to implement new programs. Participants in the study and their contemporaries will react to the information in one way or another. They may dismiss the study out-of-hand by deciding to disavow its findings as incorrect or inappropriate to their settings. It is hoped that they will, however, work to realize that the organizational culture exists, then make decisions appropriate to, and operate within the boundaries of that extant culture. If participants and their contemporaries are uncomfortable with the findings of this study, they may determine a further examination of organization culture and instructional technology implementation efforts is a worthwhile endeavor.

There has been no attempt on the part of the researcher to make a determination that one of the Douglas typologies is 'better' than another. No one typology is more suited to instructional technology implementation than another, one is not better suited to the middle school curriculum than another,

one is not better for school administration than another is. Rather, what this study hopes to do is bring about an understanding of the organizational culture of two middle school settings and report the findings of how that organizational culture plays a role in instructional technology implementation within the site. That may then be capitalized upon by the participants in order to more effectively implement instructional technology use or may be used as a framework for determining how best to approach instructional technology integration in the future.

Recommendations for Further Research

This study concentrated on two middle school/junior high school sites that evidenced culture in two of Douglas' (1982) four typologies, Individualist (weak grid, weak group) and Corporate (strong grid, strong group). Further study is warranted in middle school/junior high school sites whose organizational cultures fall into the remaining two typologies, Bureaucratic (weak group, strong grid) and Collectivist (strong group, weak grid) to find similarities and differences in the school cultures and how instructional technology use is apparent in those cultures. Only when all four typologies have been studied will a complete picture emerge of organizational culture and its relationship to instructional technology use.

With knowledge of middle school/ junior high school teacher use of instructional technology within all four typologies, further research should be conducted to develop criteria for introducing integration of instructional technology within each of the cultures and to develop criteria for improving and increasing instructional technology integration within each of those cultures.

There is also further research to be done outside the middle school/junior high school setting. Grid and group typology has been used to study teacher preferences for instructional technology use in higher education (Stansberry, 2001) in Corporate and Collectivist cultures at a large research university. Further research is warranted in the Individualist and Bureaucratic cultures. Results of those studies can be used in much the same way as results from studies in middle schools/junior high schools: developing criteria for introducing, improving, and increasing instructional technology use within those environments.

Finally, there is need for research in other settings as well. Beyond the middle schools and large research universities that have already been studied, there are a myriad of educational settings in which instructional technology use is evident and desired including elementary schools, high schools, community colleges, small colleges, and regional universities. In addition, each of those settings should be divided into public and private categories as the

organizational cultures within the public and private arenas are undoubtedly different across each of the settings. Only when a study of all environments is undertaken can a better understanding of how organizational culture relates to teacher use of instructional technology. However, the dynamics of organizational culture and specific organizations are constantly in flux and, as such, studies of those dynamics may indeed never be complete.

References

Abdal-Haqq, I. (1995). *Infusing technology into preservice teacher education* (No. EDO-SP-94-06). Washington, D.C.: Office of Educational Research and Improvement.

Anderson, G. (1998). *Fundamentals of educational research* (2nd ed.). London: Taylor and Francis.

Appalachia Educational Lab. (1991). *Bits, bytes, and barriers: Tennessee teachers' use of technology.* Charleston, WV: Appalachia Educational Lab. (ERIC Document Reproduction Service No. ED 343 580)

Association for Educational Communications and Technology. (1996). The definition of educational technology: A summary. In D. Ely & T. Plomp (Eds.), *Classic writings on instructional technology* (pp. 3-14). Englewood, CO: Libraries Unlimited.

Barron, A. E., Kemker, K., Harmes, C., & Kalaydjian, K. (2003). Large-scale research study on technology in K-12 schools: Technology integration as it relates to the national technology standards. *Journal of Research on Technology in Education, 35,* 489-507.

Barron, D. (1989). Distance education: Removing barriers to knowledge. *School Library Journal, 35*(15), 28-34.

Becker, H. J. (1999). *Internet use by teachers*. Retrieved September 30, 2003, from http://www.crito.uci.edu/TLC/ FINDINGS/internet-use/

Becker, H. J., & Ravitz, J. (1999). The influence of computer and Internet use on teachers' pedagogical practices and perceptions. *Journal of Research on Computing in Education, 31*, 356-384.

Berg, B. L. (1998). *Qualitative research methods for social sciences.* (3rd ed.). Boston: Allyn and Bacon.

Berg, S., Benz, C. R., Lasley, T. J., & Raisch, C. D. (1998). Exemplary technology use in elementary classrooms. *Journal of Research on Computing in Education, 31*, 111-123.

Bradley, G., & Russell, G. (1997). Computer experience, school support, and computer anxieties. *Educational Psychology, 17*, 267-284.

Burrus, D. (2002a). *Re-inventing education*. Retrieved March 18, 2003, from ftp://ftp.burrus.com/reinventedu.pdf

Burrus, D. (2002b). *Twenty-first century education*. Retrieved March 18, 2003, from ftp://ftp.burrus.com/edarticle.pdf

Byers, A. (1996). *Communities address barriers to connectivity*: Manhattan, KS: Rural Clearinghouse for Lifelong Education. (ERIC Document Reproduction Service No. ED 393-623)

Caulkins, D. D. (1999). Is Mary Douglas' grid/group analysis useful for cross-cultural research? *Cross-Cultural Research, 33*, 108-129.

Cavanagh, R. & Dellar, G. (1998, April). *The development, maintenance, and transformation of school culture.* Paper presented at the meeting of the American Educational Research Association, San Diego, CA. (ERIC Document Reproduction Service No. 418 962)

Chiero, R. T. (1997). Teachers' perspectives on factors that affect computer use. *Journal of Research on Computing in Education, 30*, 122-135.

Chin, S. S., & Hortin, J. A. (1993). Teachers' perceptions of instructional technology and staff development. *Journal of Educational Technology Systems, 22*, 83-98.

Cohen, D. (1987). Educational technology, policy, and practice. *Educational Evaluation and Policy Analysis, 9*, 154-170.

Collinson, V., & Cook, T. F. (2001). "I don't have enough time": Teachers' interpretations of time as a key to learning and school change. *Journal of Educational Administration, 39*(3), 266-281.

Collis, B. (1996). The Internet as an educational innovation: Lessons from experience with computer implementation. *Educational Technology, 36*(6), 21-30.

Corporation for Public Broadcasting. (1997). *Study of school uses of television and video*. Retrieved September 30, 2003, from http://stations.cpb.org/system/reports/97schoolusestudy/

Crystal, J. (2001). Building from within: Two professional development models that work. *Technology & Learning, 22*(2), 62-68.

Cummings, C. A. (1998). *Teacher attitudes and effective computer integration.* Washington, D.C.: Office of Educational Research and Improvement. (ERIC Document Reproduction Service No. ED 419 512)

Cutler, W. W. (1999). Schoolhouses and school architecture. In R. J. Altenbaugh (Ed.), *Historical dictionary of American education* (pp. 327-220). Westport, CT: Greenwood Press.

Denzin, N., & Lincoln, Y. (1994). *Handbook of qualitative research.* Newbury Park, CA: Sage.

Dexter, S. L., Anderson, R. E., & Becker, H. J. (1999). Teachers' views of computers as catalysts for changes in their teaching practice. *Journal of Research on Computing in Education, 31,* 221-239.

Dolan, C. (1994, June 27). Technology (a special report): The obstacles--off course: Although schools have spent a fortune to buy computers, they still don't know how to use them. *The Wall Street Journal, Eastern Edition,* p. R16.

Douglas, M. (1970). *Natural symbols: Explorations in cosmology*. New York: Pantheon.

Douglas, M. (1982). *In the active voice*. London: Routledge & Kegan Paul.

Douglas, M. (1989). Culture and collective action. In M. Freilich (Ed.), *The relevance of culture* (pp. 39-57). New York: Bergin & Garvey.

Douglas, M. (1992). *Risk and blame: Essays in cultural theory*. Boston: Routledge & Kegan Paul.

Durkheim, E. (1915). *Elementary forms of the religious life*. London: Allen & Unwin.

Erlandson, D., Harris, E., Skipper, B, & Allen, S. (1993). *Doing naturalistic inquiry: A guide to methods*. Newbury Park, CA: Sage.

Gagne, R., Wager, W., & Rojas, A. (1981). Planning and authoring computer-assisted instruction lessons. *Educational Technology, 21*(9), 17-26.

Giannelli, G. (1985). Promoting computer use in the classroom: The teacher is always the last to know. *Educational Technology, 24*(4), 30-31.

Gibson, S. E., & Hart, S. (1997). Project E.L.I.T.E.: A case study report of teachers' perspectives on a social studies computer pilot project. *Canadian Social Studies, 31*(4), 171-175.

Gillespie, F. (1998). Instructional design for the new technologies. In R. Menges (Series Ed.) & K. H. Gillespie (Vol. Ed.), *New designs for teaching and learning: Vol. 76. The impact of technology on faculty development, life, and work* (pp. 39-52). San Francisco, CA: Jossey-Bass.

Girod, M., & Cavanaugh, S. (2001). Technology as an agent of change in teacher practice. *T.H.E. Journal, 28*(9), 40-44.

Goodson, I., & Mangan, J. M. (1995). Subject cultures and the introduction of classroom computers. *British Educational Research Journal, 21*, 613-629.

Gross, J. L., & Rayner, S. (1985). *Measuring culture: A paradigm for the analysis of social organization*. New York: Columbia University Press.

Gruenert, S. (2000). Shaping a new school culture. *Contemporary Education, 71*(2), 14-18.

Hampton, J. (1982). Giving the grid/group dimensions an operational definition. In M. Douglas (Ed.), *Essays in the sociology of perception* (pp. 64-82). London: Routledge & Kegan Paul.

Hannafin, R., & Savenye, W. (1993). Technology in the classroom: The teacher's new role and resistance to it. *Educational Technology, 33*(6), 26-31.

Harris, E. (1995). Toward a grid and group interpretation of school culture. *Journal of School Leadership, 5*, 617-646.

Harris, E. (in press). *Understanding instructional leadership and context*. Lanham, MD: Scarecrow.

Hart, H. M., Allensworth, E., Lauen, D. L., & Gladden, R. M. (2002). *Educational technology: Availability and use in Chicago's public schools*. Chicago, IL: Consortium on Chicago School Research.

Harvey, J., & Purnell, S. (1995). *Technology and teacher professional development* (No. ERIC Document Reproduction Service ED 393 831).

HelpMySchool.NETwork. (2003). *About us*. Retrieved January 21, 2004, from http://www.helpmyschool.net/about_us.htm#Vision

Hendry, J. (1999). Cultural theory and contemporary management organization. *Human Relations, 52*, 557-578.

Hope, W. (1997). Teachers, computer technology, and the change process. *The Clearing House, 70*(4), 191-193.

Kleiner, A., & Ferris, E. (2002). *Internet access in U.S. public schools and classrooms: 1994-2001* (No. NCES 2002-018). Washington, D.C.: National Center for Educational Statistics.

Kroeber, A. L., & Kluckhohn, C. (1952). *Culture: A critical review of concepts and definitions*. New York: Vintage Books.

Levin, R. A., & Hines, L. M. (2003). Educational television, Fred Rogers, and the history of education. *History of Education Quarterly, 43*, 262-275.

Lingenfelter, S. G. (1992). *Transforming culture: A challenge for Christian mission.* Grand Rapids, MI: Baker.

Lingenfelter, S. G. (1996). *Agents of transformation: A guide for effective cross-cultural ministry*. Grand Rapids, MI: Baker.

Little, J. W. (1993). *Teacher professional development in a climate of education reform.* New York, NY: Teachers College, Columbia University.

Mars, G., & Nicod, M. (1984). *The world of waiters.* Sydney, Australia: Allen and Unwin.

Mertens, D. (1998). *Research methods in education and psychology: Integrating diversity with quantitative and qualitative approaches.* Thousand Oaks, CA: Sage.

Moursund, D. (1997). *The future of information technology in education.* Retrieved March 18, 2003, from http://www.uoregon.edu/~moursund/FuturesBook 1997/Preface.html

Mouza, C. (2002). Learning to teach with new technology: Implications for professional development. *Journal of Research on Technology in Education, 35,* 272-289.

National Center for Educational Statistics. (2003). *Core of common data.* Retrieved November 12, 2003 from http://nces.ed.gov/ccd/

National Center for Educational Statistics. (1999). *Teacher quality: A report on teacher preparation and qualifications of public school teachers.* (No. NCES 1999080). Washington, D.C.: National Center for Educational Statistics.

Norton, S., McRobbie, C. J., & Cooper, T. J. (2000). Exploring secondary mathematics teachers' reasons for not using computers in their teaching: Five case studies. *Journal of Research on Computing in Education, 33,* 87-99.

Office of Technology Assessment. (1995). *Teachers and technology: Making the connection.* (No. OTA-EHR-616). Washington, D.C.: Office of Technology Assessment (OTA).

O'Neil, J. (1995). Teachers and technology: Potentials and pitfalls. *Educational Leadership, 53*(2), 10-11.

Papert, S. (1980). *Mindstorms: Children, computers and powerful ideas.* New York, NY: Basic.

Papert, S. (1983). *The children's machine: Rethinking school in the age of the computer.* New York, NY: Basic.

Parker, D. R. (1996, January). *Integration of and roadblocks to the use of technology in teaching and teacher education.* Paper presented at the Annual Meeting of the Southwest Educational Research Association, New Orleans, LA.

Patton, M. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage.

Pea, R. D. (1985). Beyond amplification: Using the computer to reorganize mental functioning. *Educational Psychologist, 20,* 167-183.

Perelman, L. J. (1992). *School's out: Hyperlearning, the new technology, and the end of education.* New York, NY: William Morrow.

Perlstein, D. (1999). Junior high school. In R. J. Altenbaugh (Ed.), *Historical dictionary of American education* (pp. 197-199). Westport, CT: Greenwood Press.

Peterson, K., & Deal, T. (1998). How leaders influence the culture of schools. *Educational Leadership, 56*(1), 28-31.

Prosser, J. (1992). Personal reflections on the use of photography in an ethnographic case study. *British Educational Research Journal, 18,* 397-413.

Purkey, W. W. & Strahan, D. (1995). School transformation through invitational theory. *Research in the schools 2*(2), 1-6.

Quality Education Data. (1995). *Education technology survey, 1995.* Washington, D.C.: Malarkey-Taylor Associates. (ERIC Document Reproduction Service No. ED 387 124)

Ray, D. (1991). Technology and restructuring--part II: New organizational directions. *The Computing Teacher, 18*(7), 8-12.

Regan, T. (2002, August 15). *Net savvy students to teacher: You just don't get it!* Retrieved March 10, 2003, from http://www.csmonitor.com/2002/0815/p25s01-cogn.html

Reiser, R. (1987). Instructional technology: A history. In R. M. Gagne (Ed.), *Instructional technology foundations* (pp. 11-48). Hillsdale, NJ: Lawrence Erlbaum Associates.

Rogers, P. (2000). Barriers to adopting emerging technologies in education. *Journal of Educational Computing Research, 22*, 456-472.

Romano, L. G., & Georgiady, N. P. (1997). The middle school distinction, *Phi Delta Kappa Fastback No. 418*. Bloomington, IN: Phi Delta Kappa Educational Foundation.

Saettler, P. (1968). *A history of instructional technology*. New York: McGraw-Hill.

Saettler, P. (1990). *The evolution of American educational technology* (2nd ed.). Englewood, CO: Libraries Unlimited.

Schien, E. H. (1992). *Organizational culture and leadership* (2nd ed.). San Francisco: Jossey-Bass.

Schrum, L. (1999). Technology professional development for teachers. *Educational Technology Research and Development, 47*(4), 83-90.

Schwarz, M., & Thompson, M. (1990). *Divided we stand: Redefining politics, technology and social choice.* Philadelphia, PA: University of Pennsylvania Press.

Slowinski, J. (2000). *The gap between preparation and reality in training teachers to use technology.* Retrieved September 30, 2003, from http://ts.mivu.org/default.asp?show=article&id=797

Smerdon, B., Cronen, S., Lanahan, L., Anderson, J., Iannotti, N., & Angeles, J. (2000). *Teachers' tools for the 21st century: A report on teachers' use of technology* (Statistical Analysis Report No. NCES 2000-102). Washington, D.C.: U.S. Department of Education.

Solomon, G. (2002). Digital equity: It's not just about access anymore. *Technology & Learning, 22*(9), 18-24.

Spafford, C., Pesce, A., & Grosser, G. (1998). Culture. *The cyclopedic education dictionary* (p. 67). Albany, NY: Delmar.

Spotts, T. H., & Bowman, M. A. (1993). Increasing faculty use of instructional technology: Barriers and incentives. *Educational Media International, 30,* 199-204.

Stake, R. E. (1995). *The art of case study research.* Thousand Oaks, CA: Sage.

Stansberry, S. L. (2001). *Toward a grid and group description of higher education faculty preferences toward instructional technology use.* Unpublished doctoral dissertation, Oklahoma State University, Stillwater.

Theobald, P. (1999). District schools. In R. J. Altenbaugh (Ed.), *Historical dictionary of American education* (pp. 113-114). Westport, CT: Greenwood Press.

Thompson, M. (1982). A three-dimensional model. In M. Douglas (Ed.), *Essays in the sociology of perception* (pp. 31-63). London: Routledge & Kegan Paul.

Thompson, M., & Wildavsky, A. (1991). *Cultural theory.* Boulder, CO: Westview.

Tierney, R., & Damarin, S. (1998). Technology as enfranchisement and cultural development: Crisscrossing symbol systems, paradigm shifts, and social-cultural considerations. In D. Reinking, M. McKenna, L. Labbo & R. D. Kieffer (Eds.), *Handbook of literacy and technology: Transformations in a post-typographic world* (pp. 263-258). Mahwah, NJ: Erlbaum.

Topp, N. (1996). Preparation to use technology in the classroom: Opinions by recent graduates. *Journal of Computing in Teacher Education, 12*(4), 24-27.

Willis, J. (1993). What conditions encourage technology use?: It depends on the context. *Computers in Schools, 9*(4), 113-134.

Yin, R. K. (1989). *Case study research: Design and methodology.* Newbury Park, CA: Sage.

Appendix A - Institutional Review Board Approval

Oklahoma State University
Institutional Review Board

Protocol Expires: 8/27/2004

Date : Tuesday, April 13, 2004 IRB Application No ED0376

Proposal Title: PUBLIC SCHOOLTEACHER USE OF INSTRUCTIONAL TECHNOLOGY FROM AN ORGANIZATIONAL CULTURE PERSPECTIVE: AN EXPLANATORY CASE STUDY OF TWO MIDDLE SCHOOLS

Principal Investigator(s) :

Bruce Alan Spitzer
2225 W 9th
Stillwater, OK 74074

Susan Stansberry
106 Willard
Stillwater, OK 74078

Reviewed and Processed as: Expedited

Approval Status Recommended by Reviewer(s) : Approved **Modification**

Please note that the protocol expires on the following date which is one year from the date of the approval of the original protocol:

Protocol Expires: 8/27/2004

Signature : Carol Olson

Carol Olson, Director of University Research Compliance

Tuesday, April 13, 2004
Date

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modifications to the research project approved by the IRB must be submitted for approval with the advisor's signature. The IRB office MUST be notified in writing when a project is complete. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

Appendix B - Letter Requesting Entry to School Site

May 2, 2003

Mr. XXXXX XXXXXX, Principal
XXXXXXX Middle School
XXXXXXXXXXXXXXXXXXXX
XXXXXXX, XX #####

Dear Mr. XXXXXX:

I am a doctoral student in Curriculum and Instruction with emphases in Foundations of Education and Educational Technology in the College of Education at Oklahoma State University. For my dissertation study, my advisor, Dr. Susan Stansberry and I are exploring why some middle school teachers use instructional technology and some do not. I am interested in including your middle school in this study.

The study would consist of all teachers at your school site being invited to fill out an online survey of 17 items and would follow-up with me spending two days in your school observing in classrooms and interviewing teachers and IT staff members at their convenience.

In terms of a 'time-frame', I am looking at undertaking this study in the fall semester of 2003, beginning early September. I would, of course, work carefully with you to avoid scheduling conflicts or placing undue burdens upon your teachers during that time.

I have enclosed two items: first is the OSU Institutional Review Board Application for Review of Human Subjects Research which details the specifics of the study. Secondly, I have prepared a memo for your signature indicating your agreement to allow entry into your school for this study. I have also included a self-addressed, stamped envelope for your convenience.

While September, 2003 may seem quite some time in the future, I am required by the IRB to secure permission from building administrators prior to the approval of my research application. Your prompt response will be greatly appreciated.

If you have further questions or need to speak with me in person, please feel free to call me at my office (405-744-8488), my home (405-780-7007) or write me via email (bspitze@okstate.edu). I look forward to the opportunity to work with you and your faculty.

Sincerely,

Bruce Alan Spitzer
Doctoral Student, Oklahoma State University

Appendix C - Memo Granting Permission to Enter School Site

To: Oklahoma State University, Institutional Review Board
From: Principal
RE: Entry Permission, Bruce Spitzer, ED03-76

I grant permission to Bruce Spitzer, a doctoral student at Oklahoma State University, and his advisor, Dr. Susan Stansberry, conduct a study of instructional technology in my school, _____ Middle School.

Sincerely,

Name
School

Appendix D - Survey Instrument

Technology Study

School Site Personnel Survey

Thank-you for taking a few minutes to fill out this short survey. Your voluntary participation in this survey is greatly appreciated. Your identity will remain anonymous. The only information about you that will be collected is your school and your job function. Your completion of this questionnaire constitutes your informed consent to participate in this anonymous survey.

++

Preliminary Information

School: _____ XXXXXXX _____ XXXXXXX

Position:
_____ Administrator _____ Classroom Teacher _____Instructional Technology Staff

_____ Other (Please Explain): _____

++
Instructions

Below are 17 pairs of statements. For each pair, mark the statement that **BEST** represents your school site. Please remember to keep in mind your particular school site (rather than your district as a whole) as you answer each question.

It is important that one statement in each pair is selected.

Please return the survey in the self-addressed, stamped envelope marked "SURVEY"
++

___ Money to purchase classroom supplies is obtained through individual teacher negotiation with lead administrator

___ Money to purchase classroom supplies is allotted to individual teachers by the lead administrator.

___ Within your classroom, teaching activities are self-directed.

___ Within your classroom, teaching activities are authority directed.

___ Teacher responsibilities and roles are chosen by individual teachers.

___ Teacher responsibilities and roles are assigned to individuals by administration.

___ The authority structures within your site are decentralized.

___ The authority structures within your site are centralized.

___ School communication channels are informal.

___ School communication channels are formal.

___ Access to existing instructional material and facilities is obtained through individual teacher negotiation.

___ Access to existing instructional material and facilities is allotted to the teacher by the administration.

___ Hiring and placement decisions are decentralized; they are made by committees comprised of teachers and/or other employees.

___ Hiring and placement decisions are centralized; they are made by administration.

___ Curricular decisions and teaching methodologies are individually negotiated.

___ Curricular decisions and teaching methodologies are administratively prescribed.

___ Teachers are motivated by self-defined interests.

___ Teachers are motivated by institutional rewards.

___ Instructional materials and facilities are individually controlled by teachers.

___ Instructional materials and facilities are corporately controlled by the district or administration.

___ Within your site, teaching activities are initiated and planned by individual teachers.

___ Within your site, teaching activities are initiated and planned by groups of teachers.

___ Authority is ambiguous, even fragmented.

___ Authority is corporate, with clear accountability to members.

___ School 'business' communication flows primarily through individual networks.

___ School 'business' communication flows through corporately regulated/maintained processes.

___ Purchasing and resource acquisition is individually regulated/maintained.

___ Purchasing and resource acquisition is corporately regulated/maintained.

___ Hiring and placement decisions are individually regulated.

___ Hiring and placement decisions are corporately regulated.

___ Social activities and work are kept separate activities.

___ Social activities and work are commingled.

___ Productivity is evaluated according to individually-determined goals and priorities.

___ Productivity is evaluated according to group-determined goals and priorities.

++

Technology Study

Interview Volunteer

In addition to the survey information, I would like to interview both users and non-users of technology about the culture of your school site.

If you would be interested in confidentially discussing technology and school culture, please enter the following information and click the Submit button. You will be contacted in the near future.

Please return this page in the self-addressed, stamped envelope marked "INTERVIEW"

Thanks for your assistance,

Bruce Spitzer
OSU Doctoral Candidate

++

Name:

_____

School: _____ XXXXXXX _____ XXXXXXX

Telephone at which you wish to be contacted:

_____

Email Address:

_____

Appendix E - Informed Consent Form

Informed Consent

Researcher:	Bruce Alan Spitzer	**Director:**	Dr. Susan Stansberry
Address:	2225 W. 9th Avenue, Stillwater, Oklahoma 74074	**Address:**	252 Willard Hall, OSU Stillwater, OK 74078
Telephone:	(405) 780-7007	**Telephone:**	(405) 744-8043
Email:	bspitze@okstate.edu	**Email:**	stansbe@okstate.edu

Thank you for agreeing to participate in this research. This form outlines the purposes of the research and provides a description of your involvement and your rights as a participant.

Purpose of the Research

The purpose of this research is to gather interview-, document-, and observation-based data which gives insight into how middle schools teacher perceive instructional technology and how they integrate technology in their personal and professional lives.

Ultimately, the data collected will be analyzed and reported in the form of a doctoral dissertation which fulfills part of the requirement for a degree program in the College of Education at Oklahoma State University.

Informed Consent

As the primary investigator, I guarantee that the following conditions will be met:

1. Your real name will not be used at any point in the interview transcription or the dissertation. Yours and any other persons or places you name will be assigned fictitious names that will be used in all written records and reports.
2. If you grant permission for audio taping, no audiotapes will be used for any purpose other than this research. I will transcribe the tape for the purpose of accuracy and provide you with a copy of the transcript for you to comment upon. During the time I am in possession of the tapes, they will remain in a secure location not accessible to any other person or persons.
3. Your participation in this research is strictly voluntary; you have the right to withdraw at any point, for any reason, and with any damage or injury to you. If you choose to withdraw from the project before it is complete, the information collected and records and reports written that pertain to you will not be used in the study.

I agree to these terms and understand my signature indicates consent to participate in this study."

Signature of participant _____

Date _____

Signature of the researcher _____

Date _____

The participant should sign two copies. The participant receives one copy; the student researcher retains a copy.

VITA #2

Bruce Alan Spitzer

Candidate for the degree of

Doctor of Education

Thesis: PUBLIC SCHOOL TEACHER USE OF INSTRUCTIONAL TECHNOLOGY FROM AN ORGANIZATIONAL CULTURE PERSPECTIVE: AN EXPLANATORY CASE STUDY OF TWO MIDDLE SCHOOLS

Major Field: Education, Curriculum and Instruction

Biographical:

Personal: Born June 5, 1962, in Iowa City, Iowa, the son of Terry Eugene and Delores Jane Spitzer.

Education: Graduated from Mid-Prairie High School, Wellman, Iowa, in May, 1908; Bachelor of Arts degree in Speech and Drama from McPherson College, McPherson, Kansas, May, 1984; Master of Arts degree in English from Fort Hays State University, Hays, Kansas, May, 1993. Completed the requirements for the Doctor of Education degree at Oklahoma State University, Stillwater, Oklahoma, in May, 2004.

Experience: 1984-1989: Speech and Drama Teacher, Eureka Junior-Senior High School, Eureka, Kansas; 1989-1990: English and Journalism Teacher, Maur Hill Prep School, Atchison, Kansas; 1990-1999: English Instructor, Allen County Community College, Iola, Kansas; 1999-2001: Vice President of Instruction, Teletraining Systems, Inc., Stillwater, Oklahoma; 2001-present: Graduate Teaching and Research Assistant, Oklahoma State University, Stillwater, Oklahoma.

Professional Memberships: Association for the Advancement of Computing in Education, Society for Information Technology in Teacher Education; Association for Educational Communications and Technology.