Public School Teacher Use of Instructional Technology from an Organizational Culture Perspective: An Explanatory Case Study of Two Middle Schools

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Abstract

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

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) *(see Figure 1)*. 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 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.

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 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 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 are not '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 fully understand 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.

Maple Grove Middle School

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.

Hillwood Junior High School

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.

Comparison of Maple Grove Middle School and Hillwood Junior High School

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.

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.

Figure 1
Mary Douglas' Typology of Social Environment Prototypes

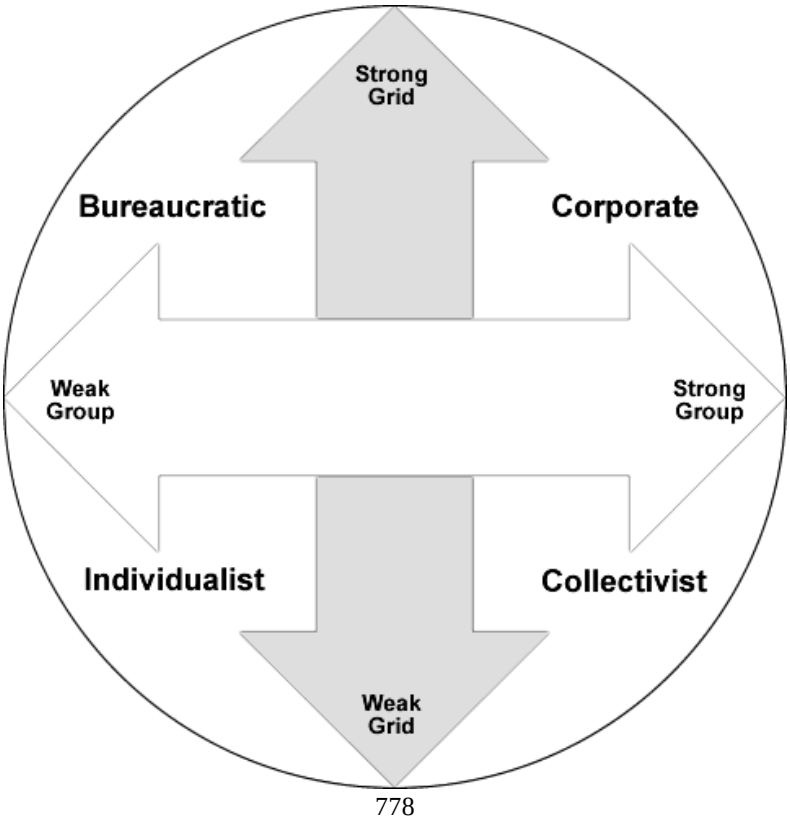


Figure 2
Maple Grove Middle School's Grid/Group Typology

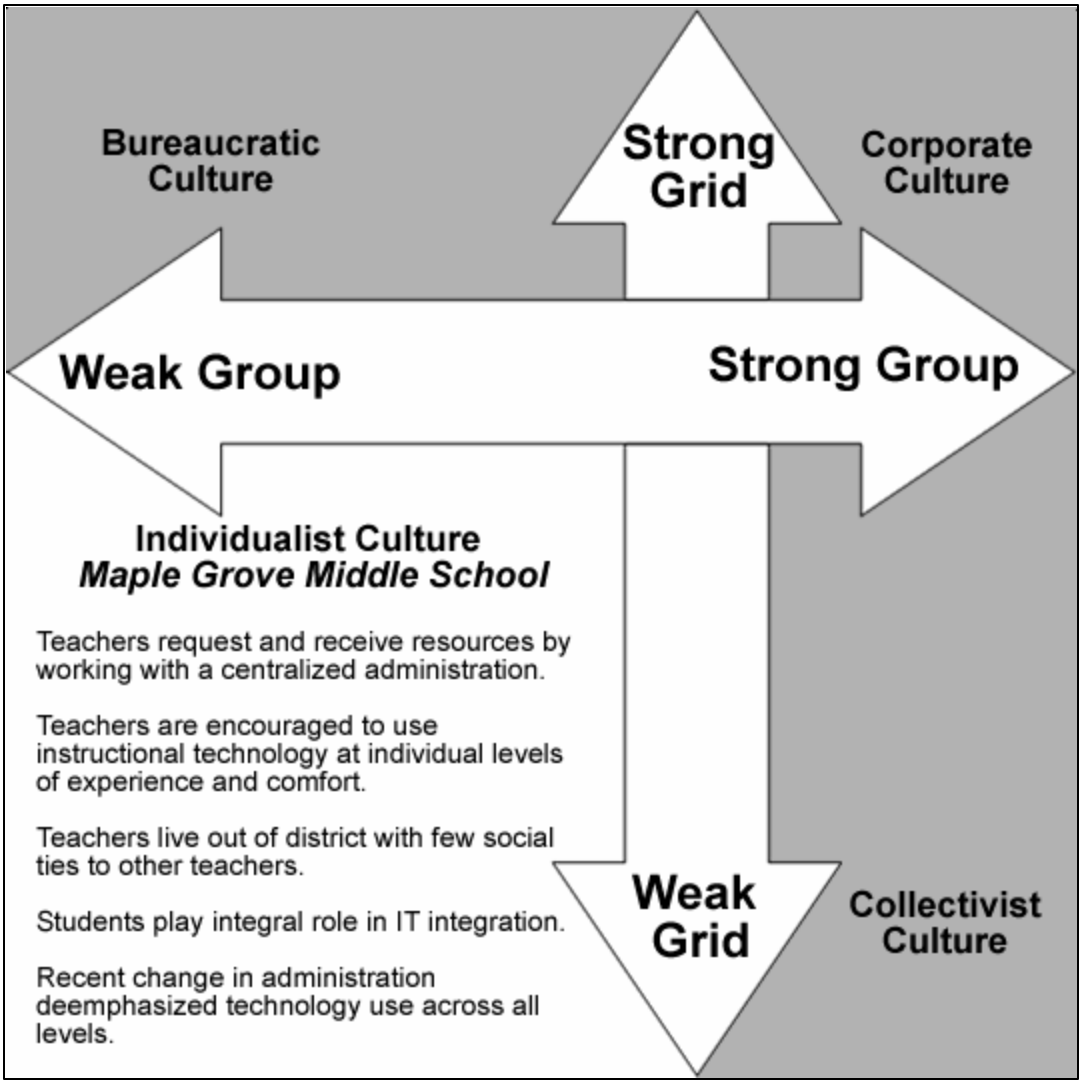
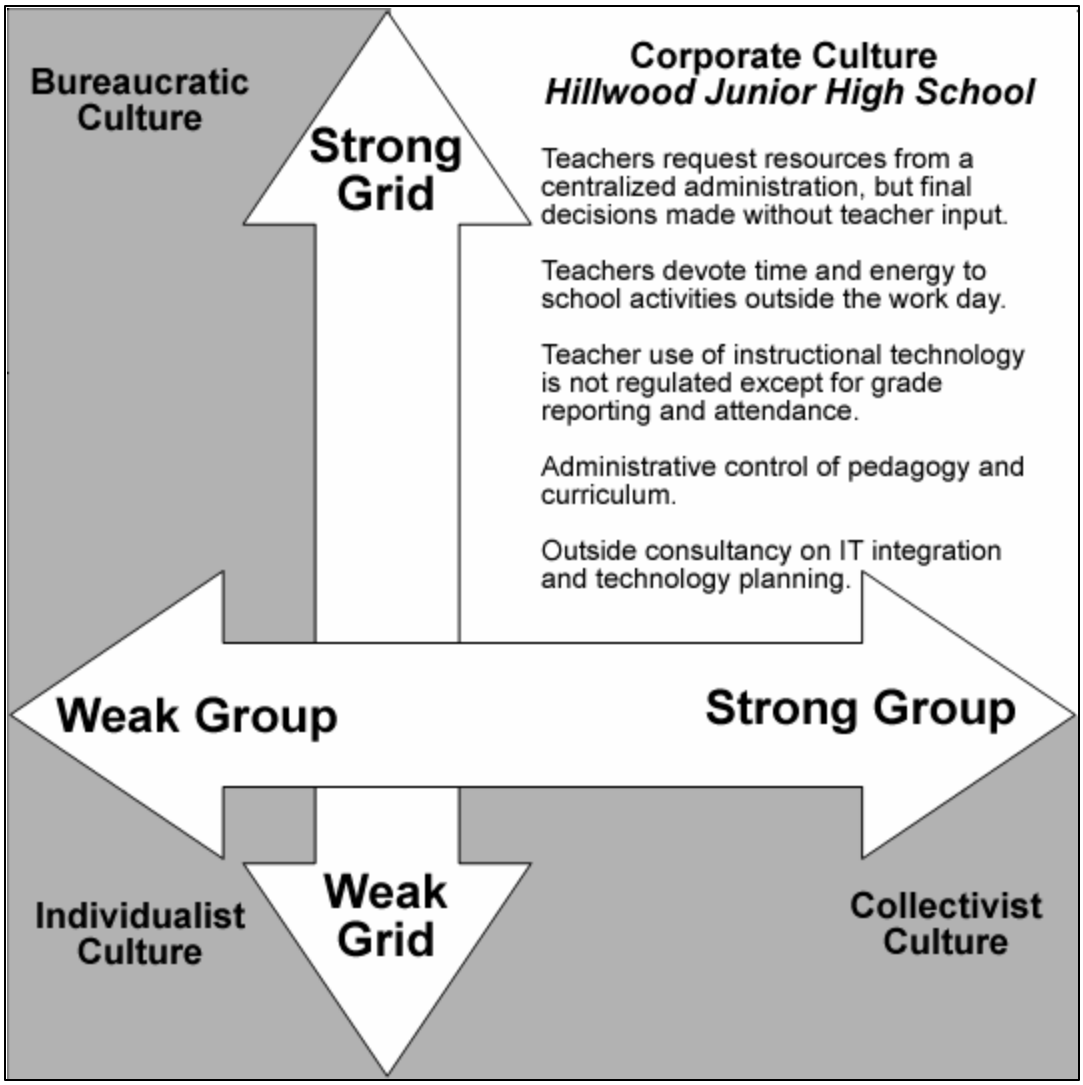


Figure 3
Hillwood Junior High School's Grid/Group Typology



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