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THE IMPACT OF COMPUTER MEDIATED COMMUNICATION
ON CURRICULUM DEVELOPMENT

By

Susan W. Meston

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ABSTRACT

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Although computer technology offers the possibility for teachers to connect electronically for curriculum development, specific challenges must be addressed and overcome for this to occur. These challenges include technology training, access to and availability of efficient computer systems, leadership, time constraints, funding requirements, and social context issues.

The purpose of this ethnographic study was to identify, through qualitative analysis, the impact of computer mediated communication (CMC) on curriculum development by geographically dispersed, practicing teachers.

This research was grounded in the review of three bodies of research and professional literature, including traditional approaches to curriculum development, CMC, and the intersection of CMC and curriculum development. The study focused on a group of 43 teachers in Michigan as they developed a K-12 curriculum on the teaching of philanthropy and civic responsibility.

The primary data sources for this research were focus group interviews of participating teachers, individual interviews of staff, and archival data that included teacher journals. Information gathered from the data sources were considered through the process of constant comparative analysis. A number of themes were developed as a result of the data analysis. Teacher and staff perceptions and ideas regarding the impact of CMC on curriculum were noted through quotations.

This research determined that using CMC as a tool when developing curriculum offers certain benefits to the process. CMC increases the communication options in a curriculum development project and can add flexibility to the process. CMC also offers the ability to communicate asynchronously and to edit lessons on-line, and the potential for holding fewer face-to-face meetings. Further, the management features offered through CMC can enhance a curriculum development project by providing a record of exchanges, easy access to lessons, and the ability to print or forward materials efficiently.

The research also identified factors associated with the use of CMC in a curriculum development project that may impede the process. Lack of computer experience and skill of participants can cause the project to lag and require expenditures of time and money for computer training. Computer systems and networks must be efficient and accessible, which may not always be the case for all members of a curriculum project. Lack of adequate local technical support could also impede the process. Finally, having adequate time to learn computer skills and content was an issue for the participants.

The importance of face-to-face meetings to the curriculum development process, even for projects employing CMC as a tool for curriculum development, was a significant finding of this study, as was the importance of strong project leadership.

To Milton D. Meston, the love of my life.

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CHAPTER I

INTRODUCTION

Purpose of the Research Study

This research study examined the impact and raised the relevant issues related to

the impact of computer-mediated communication (CMC) on the development of

curriculum units by geographically dispersed, practicing teachers. Employing an

ethnographic approach, this study followed 43 teachers as they developed and

implemented the lessons and units of a K-12 curriculum in the teaching of philanthropy.

Traditional methods of curriculum development have not included the use of electronic

communication. Therefore, this project encompassed a new approach to an important

educational process. This research makes a contribution to both theory and practice by

informing teachers, curriculum specialists, and education policy makers about those issues

important to the use of CMC when designing curriculum.

Statement of the Problem

Computer technology offers the possibility for teachers to connect electronically

for communication, research, and participation in collaborative projects, such as

curriculum development, unit writing, and professional development. However,

significant challenges must be addressed and overcome for this to occur. For example, the

important requisite for computer training encompasses expenditures of time and money.

This includes time for the training, whether during or after school, and money for substitute teachers or for stipends, in addition to trainer costs. Reliable access to computers as well as the need for technical support arise as potential barriers to computer use. Also, funding must be available for up-to-date software and hardware and for the array of essential technical support. A further challenge is related to the leadership necessary to set the technical direction for a school district and a standard for technical literacy. A final example involves the historical isolation of teachers. Expecting a teacher to communicate electronically for the purpose of working collaboratively is asking that teacher to step out of the comfort zone of the classroom.

These previous points have relevance to this study, which focused on a group of geographically dispersed, practicing teachers throughout Michigan who participated in a project to collaboratively develop a curriculum on the teaching of philanthropy in the schools. There were a number of dilemmas associated with this project. For example, the teachers were required to learn to use computers for communication, information gathering, peer support, and for the development of curriculum units, while at the same time attending to their various teaching responsibilities.

This research has implications for curriculum development and how the use of technology and electronic communication might affect that process. Because teachers are professionally isolated, computer technologies offer them a unique opportunity to break this isolation and to develop more collegial approaches to their work. Whether or not they elect to use this powerful technology tool to break the professional isolation and rely on the efficacy of technology for curriculum development are questions of vital interest. Would electronic communication result in fewer meetings, thus less release time and lower

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costs? Does electronic communication have an impact on the curriculum development process? Although there are bodies of literature that have addressed curriculum development (Doll, 1974; Elmore & Fuhrman, 1994; Glatthorn, 1987; Jacobs, 1989; Tanner & Tanner, 1980) and electronic communication (Davis & Brewer, 1997; Kollack & Smith, 1994; Reil & Levin, 1990; Sproull & Kiesler, 1992; Turkle, 1997), there is no body of data-based research that has examined the impact of CMC in relation to curriculum development. The research presented here provides a starting place for considering the role that CMC can play in the development of curriculum.

Significance of the Problem

This study of the impact of electronic communications on curriculum development contributes to the field of education in a number of ways, informing practice and policy as well as research. Because policy can serve as an instrument of curriculum control (McDonnell & Elmore, 1987), the knowledge gained from this investigation is useful to school administrators in developing policies related to curriculum, such as those that dictate teacher release time, promote computer use and training, or define the curriculum planning and development process. Further, the policies could influence teacher-hiring practices by setting a standard to hire teachers who have skill and experience in the use of computers. In addition, because of the increased focus on state-level governance of curriculum (Elmore & Fuhrman, 1994), this research can inform members of the state educational bureaucracy regarding projects that use CMC.

The primary focus of teaching involves the transference of knowledge to ensure student learning. With this comes the necessity for the teacher to research information, as

needed, particularly with the explosion in knowledge that is part of present American culture. Now and in the future this information can be found in electronic form on an expanding web of educational resources on the Internet. It is increasingly important that teachers have adequate technological skills to further their own knowledge as well as to assist their students in using computer technology for a variety of purposes, including accessing information. Thornberg (1994) suggested, "Our challenge, quite simply, is to use our tools to prepare people for their future, not for our past" (p. 25).

Wier (1992) found that a benefit of participation in an electronic community includes increased collaboration throughout an educational system. This study considered the effect of CMC on community building. Insights were gained that have significance to teacher isolation and collaboration that could be interesting to practitioners and policy makers alike. Through CMC, geographic limitations on professional collaboration can be erased, providing teachers with the ability to discuss their teaching with both content experts and teaching colleagues in distant locales.

Because there is no body of literature that has carefully considered the impact of electronic communications and computer technology on curriculum development, this study has advanced the field in this area, contributing to the fundamental knowledge of both electronic communications and curriculum design. This research also informs others planning projects with geographically dispersed participants who are linked through computer technology.

Context of the Study

This study was undertaken through a statewide project sponsored by the Council of Michigan Foundations. The Council obtained funding for the development of a K-12 curriculum on the teaching of philanthropy. For the purposes of the project, the definition of philanthropy is private action for the public good, including the activities of the nonprofit sector and citizen action. The intention of this project, which is called the K-12 Education in Philanthropy Project (see Appendix A), is to ensure that every child understands the connection between voluntary civic engagement and the evolution and sustenance of a democracy. A quotation from the project case statement points out,

> The long-term goal of the project is to develop and replicate curriculum lessons, units, and materials for perpetuating a civil society through the education of children about the independent sector, and to achieve their commitment to private citizen action for the public good. The lessons, units, and materials that are a part of the curriculum contain both academic content about philanthropy, and skill development activities which involve students in giving and serving communities.

Advisors for the planning of the K-12 Education in Philanthropy Project included classroom teachers, service learning coordinators, and school administrators. This project maintained close involvement with the Michigan Department of Education staff, most significantly the social studies consultant, and an advisory board, called the Steering Committee, made up of experts in various fields.

The K-12 Education in Philanthropy Project has been funded through significant grants from both state and national foundations, with a phase one budget for 1977-1999 of approximately $2.5 million. The project staff includes a director, a curriculum specialist, and a secretary. In early 1999, a marketing specialist was added to the team. In addition,

contracted services were purchased for technology/media support, student assessment, and program evaluation.

Thirty-six teachers who teach in different locations in Michigan were selected for participation in the project through a competitive application process. Because the applications from teachers were excellent, and due to an interest in gathering a representative pool of educators (urban, suburban, and rural districts; public and private schools; men and women; ethnic minority representatives), the Steering Committee decided to expand the pool of participating teachers.

The original 36 teachers were called the Matrix teachers because they fulfilled the requirements of a matrix that was used in the selection process. The Matrix teachers received computers and software through project funds. The remaining teachers were called Affiliates. They did not initially receive a computer as a part of their participation. After the project began, the staff independently sought funds through local community foundations to ensure that all of the teachers in the project had uniform computer equipment and software.

Representing early, middle, and high school grades, the teachers were from urban, suburban, and rural districts, and both public and private schools. Principal support was a prerequisite for teachers' participation in the project. Each teacher received a new computer with Internet connectivity, a full complement of software, a laser jet printer, a possibility of receiving $5,000 for their classrooms (if budget goals were met), paid attendance at various inservice programs, and numerous quality materials. A number of the teachers also received release time during the fall semester of 1997 to research and write curriculum units.

An important component of the curriculum development process involved teacher communication with each other and project staff via electronic transmissions. The intention was to encourage sharing of resources, information, insights, research, curriculum ideas, and lessons through this mode of communication. This developed curriculum has the potential to serve as a model for adoption nationally and internationally. At the national level there is a call for re-engaging young people in the democratic process (Robelen, 1998). Further, with the fall of the Soviet Union, leaders from emerging democracies are looking to the United States for guidance in teaching about democratic and philanthropic principles to their children. The K-12 Education in Philanthropy director has received six such requests.

At the state level, the curriculum is tied to the Michigan Curriculum Frameworks and the Standards for the Social Studies. Of particular relevance is the social studies strand on teaching civic engagement, which is part of the Michigan Model Core Curriculum. The Michigan Council for the Social Studies endorsed the project, while the National Council for the Social Studies calls civic education its number one priority for social studies teachers.

Eventually the curriculum lessons and student assessments are to be made available free of charge over the Internet through the project website, and through the national system of community foundations. The use of the curriculum will also be promoted by state and national professional social studies education organizations. These materials will be easily exportable to classrooms not only because of their ease of access, but also because they are classroom ready.

Delimitations of the Study

The researcher did not study the effectiveness of curriculum content, whether there were any actual curriculum changes, teacher attitudes toward change processes, how to implement a technology curriculum, or the traditional curriculum design process. Further, neither the impact of release time on the project nor possible differences between the Matrix and Affiliate teachers were studied. However, this research includes the perceptions of teachers regarding the impact of computer technology on the way they previously designed curriculum and current practices.

Conceptual Framework

The lens through which this study was viewed is grounded both in the literature and in an analysis of the data collected. Building first on a review of three bodies of literature, curriculum development, CMC, and the intersection of CMC and curriculum development, the researcher developed an initial conceptual framework for the study. This initial framework is shown in Figure 1.1 and depicts factors that influence curriculum development in a networked project.

These identified factors can have an effect on curriculum development in a networked project. A networked project is one in which participants communicate through the use of a computer network. The researcher grouped the influencing factors into six categories for the purpose of organization and discussion. These categories and factors are not independent of each other; rather, they interact in ways that may have an impact on the overall curriculum development process. For example, those factors

Knowledge & Skills

Computer Anxiety
Technology
Experience
Curriculum

Frequency of Use

Time
 Access &
Availability
Ease of Use
System Efficiency
Gender
Motivation

Curriculum Development in a Networked Project

Sense of Collaboration

Asynchronous
Communication
Group Identity
Feeling of Obligation
Sense of Purpose

Organizational Context

Freedom
Organizational Norms
Changes in Social
Context

Planning

Grass-roots Input
Reason to Participate
Bottom-up Selection
Phase in Implementation
Funding
Participant Selection
Process

Organizational Support

Planning
Technical support
Purpose
Leadership
Administrative Support

Figure 1.1: Curriculum development in a networked project: Influencing factors derived from the literature.

affecting the frequency of computer use are related to a project participant's knowledge and skills with computers.

The construct identified in Figure 1.1 is briefly reviewed here, beginning with *Planning* and moving counter-clockwise around the figure. *Planning* encompasses those factors that are evident in the initial design of and preparation for the project. *Organizational Context* includes the conditions that make up the environment of the project participants. Those factors that have an impact on how often a project member engages in the use of CMC for curriculum development are reported under *Frequency of Use*. Factors relevant to the knowledge and skills of the participants are listed under the *Knowledge and Skills* category. *Sense of Collaboration* includes those factors that may influence the level of collaboration of the project members and project leaders. Finally, *Organizational Support* identifies support factors within the organizational structure that support the networked project.

Assuming an inductive stance in an effort to derive meaning from the data and relevant literature, the emerging theory proposes a new pattern. Figure 1.2 presents this new pattern as themes associated with the impact of CMC on curriculum development.

As with the factors identified in Figure 1.1, the themes in Figure 1.2 do not stand alone; they interact with the other themes and factors presented. These themes identify those factors, both positive and negative, associated with the impact that the use of CMC has when developing curriculum in a networked project. The theme that includes *Technical/Mechanical* factors encompasses the mechanics and technical issues involved in keeping a networked system running. Next, the theme identified under the

Technical/Mechanical

System Reliability
Access
Technical Support

Organizational

Project Leadership
Planning and Management
Support and Sharing
Information overload

**Themes
Associated with
The Impact of CMC
On Curriculum Development**

Context

Organizational Norms
Prior Opportunity
Organizational Support
Gender ?
Grade Level

Individual Use

Time
Family Support
Purpose
Commitment
Emotions

Curriculum Development

Asynchronous Communication
Flexibility
Time and Distance
On-Line Editing
Lesson management

Figure 1.2: The impact of CMC on curriculum development.

Organizational heading includes those factors related to the organization, planning, and management of the project. The *Context* of educational settings also has an influence on the use of CMC for curriculum development.

Two additional themes are associated with the impact of CMC on curriculum development. The process of *Curriculum Development* can be influenced by the features that CMC brings to the process. Finally, those factors associated with *Individual Use* can have an impact on the frequency and level of communication within a networked project.

Figure 1.2 is described with fuller depth in Chapter V of this research.

Research Questions

Given the focus of this study on the impact of electronic communication on curriculum development and the conceptual framework as well as the emerging theory, a number of questions surfaced as important to this research. The primary question examined was: What is the impact of computer mediated communication (CMC) on the development of curriculum units by geographically dispersed, practicing classroom teachers? To address this question, it was important to consider several subquestions. They include:

1.   What is the impact of CMC on individual practice?

    a.   How is the use of CMC different from other modes of communication, and how has it affected the use of these other modes of communication?

    b.   For what purposes do participants use CMC?

    c.   What impacts the frequency of communicating electronically?

    d.   What components of computer training and support impacted participant use of CMC?

e.   How has the K-12 Education in Philanthropy Project encouraged participants to employ CMC in their efforts to produce a curriculum on the teaching of philanthropy and civic responsibility?

2.   What is the impact of CMC on the process of curriculum development and the individual?

   a.   How does CMC inhibit and enhance curriculum development?

   b.   What factors assisted and what factors deterred teachers from using CMC when developing curriculum?

   c.   What role does CMC play in building a sense of community?

3.   What are the implications of this study?

   a.   What are the implications of this study for practice?

   b.   What are the implications of this study for policy?

   c.   What are the implications of this study for further research?

Overview

The chapters that follow provide insight into the stated research questions.

Chapter II offers a review of three bodies of literature relevant to the topic under study, including traditional methods of curriculum development, CMC, and the intersection of CMC and curriculum development. Chapter III details the methodology employed in this research. Research Questions 1 and 2 are addressed in Chapter IV, whereas Research Question 3 is reviewed in Chapter V. Themes associated with the impact of CMC on curriculum development are also considered in Chapter V.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

This research examined the impact of CMC on the development of a specific

curriculum by geographically dispersed, practicing teachers. The study considered under

what circumstances and conditions CMC assists and/or inhibits practicing classroom

teachers in the development of lesson plans and curriculum units.

Three bodies of research and professional literature were reviewed as a means to

better understand this research problem: (a) traditional approaches to curriculum and its

development, (b) CMC, and (c) the intersection of curriculum development and CMC.

This broad research base provided a framework for undertaking the study.

Against the backdrop of traditional curriculum development approaches, the

researcher considered the dimension that electronic communication brings to the process.

The review assisted the researcher to understand the depth of the issues related to CMC.

The investigator sought to understand what the research suggests regarding how people

communicate electronically through the use of computers. A sparser body of research that

was reviewed revealed how geographically separated people have used computer

technology to develop curriculum collaboratively. The literature review connects this

study to a larger body of work, offers insights extracted from relevant studies, and

provides a benchmark for considering the results of this study in relation to other findings.

Curriculum and Its Development

What Is Curriculum and How Is It Contextualized?

An understanding of what the curriculum actually entails can be problematic

because many definitions of curriculum exist. Ponder (1995) indicated that, "like history,

the definition of curriculum is re-written regularly" (p. 235). In the 1970s, Doll (1974)

reflected that the commonly accepted definition of the curriculum had changed from

course content and lists of subjects and courses to the myriad of experiences offered to

learners through the auspices and direction of school (p. 22). Schlecty (1990) went so far

as to refer to curriculum as the "lore of the tribe" (p. 89). Short (1995) suggested that

curriculum practice involves those practical activities that are involved in conceiving,

justifying, and enacting education (p. 1.7), whereas Glatthorn (1987) offered this

definition: "The curriculum is the plans made for guiding learning in schools, usually

represented in retrievable documents of several levels of generality and the implication of

those plans in the classroom" (p. 10). He added that learning takes place in an

environment that influences what is learned. Others have viewed curriculum as a blueprint

for instruction and the curriculum planner as an architect (Jacobs, 1989; Pratt, 1994).

As depicted in the examples above, curriculum is a word of many meanings. It can

be used to describe an organized body of goals, objectives, and units all wrapped into a

scope and sequence. Sometimes the word *curriculum* refers exclusively to content; other

times it is considered both the content and the instructional strategies employed in

teaching. Currently the definition of *curriculum* embodies three integrated subsets: (a) content (what is taught), (b) instruction (how it is taught), and (c) assessment (how student learning is measured) (Association for Supervision and Curriculum Development, 1995). In past definitions of curriculum, assessment was not given much emphasis.

The work of designing and implementing a curriculum occurs within a context that influences the content and curriculum emphasis, as well as the strategies for implementation and assessment. Historically, what was taught and to whom it was taught was "in the deepest sense a subject for determining who was allowed to participate in the political process in society" (Elmore & Fuhrman, 1994, p. 6). Disallowing slaves and women from participation in the educational process is a glaring example of this circumstance. The early focus on education related to Bible study is another example of the relationship of context to content.

Tanner and Tanner (1980) suggested that curriculum designs are the outcome of decisions made at the national, state, school system, building, and classroom levels, and by individuals and groups. More recently, national curriculum themes have developed, to a large extent as a result of professional networks and organizations. For example, the American Association for the Advancement of Science (1989) published a ground-breaking book, *Science for All Americans,* that has set a standard for science education. These curriculum themes are finding their way into state and national policy. Evidence of this can be seen in the keen interest in the 1990s by the state governors, who are now taking a role in educational policy making by collectively supporting educational reform. The curriculum is subject to strong national influences through textbook adoptions and national education policy that can dictate practices associated with funding (Elmore &

Fuhrman, 1994). Policy can also serve as an instrument of curriculum control through state and district requirements concerning the curriculum itself, instructional materials selected and/or provided, and student assessment practices (McDonnell & Elmore, 1987). But not all policies have equal impact. In a study of math and science instructors in 18 high schools across 12 districts in 6 states, Porter, Smithson, and Ostoff (1994) determined that the most influential policy initiatives affecting curriculum are the ones backed with authority and power, that clearly describe the goal, and that specify how the policy is to be attained.

Elmore and Fuhrman (1994) summarized that there are four main trends in curriculum policy and governance that are now emerging:

1. The increased focus on state-level governance of curriculum and teaching.

2. Growth of national forces in determining curriculum policy, such as professional subject matter organizations and groups formed around national goals.

3. A more direct connection between curriculum and student performance assessment.

4. A focus on providing rigorous academic instruction to a broad base of students.

During the 1990s, substantial political and social pressures have squeezed school systems to dramatically improve student achievement as measured by standardized and state-developed assessments. As a result, many school systems have adopted a "quick-fix" attitude to address the issue of student achievement because those applying the pressure are seeking quick results. These pressures can ultimately affect the curriculum,

the curriculum development process, and instruction. The stakes are high: A district's reputation, people's jobs, and income for the district are all involved.

Along with political and social pressures is the demand for new knowledge and skills that encourage schools to add new curricula. Yet, old curricula are not abandoned. The importance of establishing a curriculum focus and orientation that serves as a reference point for curriculum design as noted by Pratt (1994) becomes clear. This orientation serves as the umbrella for establishing curriculum and instruction priorities, and makes the underpinnings of the curriculum philosophical rather than technical. Pratt suggested that curriculum planners build their curriculums from a philosophical base. He offered, by way of example, four orientations to curriculum work:

1. Cultural transmission, which emphasizes the traditional academic disciplines.

2. Social transformation, emphasizing political and social change.

3. Individual fulfillment, emphasizing personal growth, relationships, and self-actualization.

4. Feminist pedagogy, emphasizing a more equitable balance among gender-related characteristics and interests (p. 22).

Curriculum design in the future will need to include the philosophies in which many stakeholders are involved—educators, business leaders, civic groups, parents, and government. Such efforts will be driven by "changes in society, technological advances, and the interweaving of our national goals with international growth and development" (Sheeran & Sheeran, 1996, p. 47).

Approaches to Curriculum Design

Approaches to the design of curriculum go through cycles that reflect current thought. The national curriculum organization, the Association for Supervision and Curriculum Development (ASCD), provides a view of curriculum development from a variety of perspectives, informing practitioners through books and journals that document research, best practice, and theories.

The need for coherence in a curriculum developed from a sense that the curriculum in many schools is disconnected and fragmented and even detached from the goals and standards of the community (Beane, 1995; Kniep & Martin-Kniep, 1995). In a more specific sense, the quest for coherence is also apparent in content areas such as the language arts (Tchudi, 1995), and as it relates to student performance assessment (Wiggins, 1995). Beane suggested that a coherent curriculum is one that makes sense as a whole and includes parts that are connected, identifies meaningful contexts, and helps the learner to fully understand and integrate learning experiences. Coherence emerges as a fundamental characteristic of a worthwhile curriculum (p. 3).

Various authors have focused on curriculum integration as an advantageous strategy for curriculum development and delivery (Jacobs, 1989a; Jacobs & Borland, 1986; Palmer, 1995; Pate, McGinnis, & Homestead, 1995). Jacobs and Borland proposed the Interdisciplinary Concept Model to bring together the different discipline perspectives and focus them on the investigation of a target theme, issue, or problem. The curriculum development process includes (a) selecting an organizing theme or focus, (b) exploring the theme from different perspectives, (c) establishing guiding questions that serve as a scope and sequence, and (d) writing activities around the theme for exploration. Although an

integrated curriculum may result in a more coherent approach, Ladson-Billings (1995) argued for disentangling the two concepts because an integrated curriculum could lack coherence.

Glatthorn (1994) proposed a quality approach to curriculum development. He maintained that, because improved student achievement is the most critical outcome of the curriculum development process, teachers should play a significant role in the development of curriculum, its integration and delivery. His approach emphasizes quality processes and quality products while borrowing from the principles of Total Quality Management as advanced by W. Edwards Deming. The guidelines for this approach to curriculum development include a focus on student learning, an emphasis on quality, and a constancy of purpose and continuous improvement (Glatthorn, 1994, pp. 5-6). Glatthorn's ideas support careful planning at all phases of the curriculum development process and are offered in a practical, step-by-step format, a format supported by others such as Renzulli (1997), Pratt (1994), and Carr and Harris (1993).

In an earlier book, Glatthorn (1987) followed a similar practical approach to curriculum development, writing the book as an "operator's manual" and a self-described "how to do it book" (p. ix). Glatthorn's intention was to take the mystery out of creating and implementing curriculum. He offered detailed ideas for curriculum renewal, including how to (a) ensure that a school district's goals are reflected in its curriculum, (b) improve instruction in specific content areas, (c) develop a new course of instruction, and (d) adapt the curriculum so that it is responsive to individual differences.

In discussing curriculum trends, Glatthorn (1997) pointed out that experts offer a *recommended* curriculum, which he suggested is one of six curriculums at work in

schools. The *written* curriculum, represented in curriculum documents, is intended to guide what is taught. However, the *taught* curriculum is what is actually delivered in the classroom. What stands tall in influence is the *tested* curriculum because school systems and teachers are often measured by the results of assessments. The *supported* curriculum, that which is embedded in texts and materials, also has great influence on what is taught. Finally, the *learned* curriculum is what students actually learn and understand from teacher instruction.

Glatthorn (1997) went on to propose guidelines for curriculum development, recommending flexibility because of the complex nature of curriculum development. He further noted that curriculum leaders use the *recommended* curriculum as part of the knowledge base because it represents a set of benchmarks for evaluating locally produced guides, and serves as the basis for staff development. Next, he suggested that special attention be paid to emerging content and curriculum standards in a given field, and to state frameworks. Glatthorn indicated that, because depth of knowledge supersedes coverage in importance, one should ensure that curriculum reflects a constructivist perspective, and he suggested a reasoned approach to curriculum integration. Last, he recommended that curriculum developers beware of the hyper-verbalization of the curriculum, which he described as an emphasis on verbal learning to the exclusion of other ways of knowing.

In the late 1980s, the Thinking Curriculum was proposed as a way to integrate two major issues in the domain of curriculum and instruction, knowledge and thinking. Rather than treating thinking as a separate part of the curriculum, this approach involves considering content in ways that encourage thinking, and sets the stage for addressing

curriculum and instruction based on conceptions of thinking validated by cognitive

research (Resnick & Klopfer, 1989). Several authors have addressed teaching for

understanding in the content areas of science, mathematics, and writing. Minstrell (1989),

Schoenfeld (1989), and Hull (1989) all used this curriculum development method.

Differences in the approaches referred to above are more related to the emphasis

of the approach than with an underlying philosophical disagreement. The standard against

which the authors generally have compared their ideas is current practice, which the

authors often have considered wanting. The approaches are much more similar than

dissimilar, and a reflection of the nation's largest curriculum organization, ASCD, the

publisher of the bulk of the work. Each approach includes a systematic method for

addressing curriculum planning, views curriculum as both the content of the curriculum

and instruction, plays attention to the importance of student performance assessment, and

is framed in relation to what is perceived as current practice.

Renzulli (1997) proposed the Multiple Menu Model as a means to integrate

content and process. This model, which includes planning guides that teachers can use to

design in-depth curriculum units for classroom use, differs from traditional approaches in

that it places greater emphasis on balancing content and process and considers the

interconnectedness of knowledge. The major point of departure with traditional

approaches is the very deep involvement of students with the teacher in the curriculum

development process. Underlying this discipline-based model are two basic assumptions:

It is impossible to teach everything important in a discipline, and inquiry is necessary.

Renzulli supported the importance of both thinking and knowledge to learning, a

perspective shared by Resnick and Klopfer (1989), as well as the interconnectedness of

curriculum disciplines that has been recognized by other authors (Jacobs, 1989b; Jacobs & Borland, 1986; Palmer, 1995).

Curriculum development can also be viewed as a means of providing professional development to teachers (Parke & Coble, 1997; Zellermayer, 1997). The goal of this approach is to link theory to practice. Parke and Coble (1997) found through interviews with teachers that the process of developing curriculum had value as a professional development experience for them. Consequently, they proposed a model for transformational science teaching that enlists the process of curriculum design to challenge the teacher as learner to connect theory and practice in ways that improve teaching (p. 776).

Other authors have paid more attention to the way in which teachers and systems actually shape the curriculum experience (Holt, 1996; Schwab, 1978). Holt suggested that although the traditional approach to curriculum development that focuses on outcomes and resources is appealing, it can be superficial because, in practice, curriculum is generally not developed in a deterministic way (p. 248). He recommended a more natural, deliberative approach that arises naturally in the process of curriculum design and draws from Deming's (1993) principles of management. In comparing curriculum design to the making of the movie *Casablanca*, he offered that the essence of a deliberative approach is its focus on the practical and the creative and eclectic use of theory, which will guide action rather than derive objectives.

Little empirical research exists that has tested the assumption that curriculum models do influence the curriculum developed. One such study conducted by Frey, Frei, and Langeheine (1989) concluded that the type of curriculum development process

adopted carries no implications for the ensuing curriculum. In this study, which was conducted at a school of electrical engineering in Zug, Switzerland, the researchers compared three distinct models for curriculum design. The details of this study are not developed here. It is alluded to as a reference to the lack of research in this area and to show that what does exist is of a highly specialized nature.

Curriculum Design Process Issues

Although curriculum design is a complicated process to be approached with flexibility in mind, models of curriculum design are generally visualized as a flow chart presenting each element in an ordered progression. Those who develop curriculum are aware that the actual work of instructional design, rather than being linear, is convoluted and recursive. Metaphorically, the road to a body of work called the curriculum is more than bumpy; some days it is muddy, and other days detours are encountered or the road is blocked. Occasionally, all the lights are green and bits and pieces fall smoothly into place.

A significant real-world dilemma when developing curriculum is the issue of time—time to create, time to meet, and teacher release time from classroom responsibilities. Adding to this problem is the shortage of substitute teachers and the quality of instruction that occurs when the classroom teacher is absent. Another layer of interference could very well be a teacher contract, which can strictly define the who, the when, and the amount paid for curriculum work. The knowledge, skills, and abilities that teachers hold for developing curriculum also impact the process. Further, curriculum development requires collaboration in a team structure. These noted issues receive scant mention in the

literature on curriculum development, but are apparent during the curriculum development process.

Tensions have evolved as a result of the different kinds of questions researchers and curriculum designers, alike, have asked. What is sufficiently significant to be taught, how it will be taught, and to whom it will be taught are but some of the tensions related to curriculum development. People hold deep beliefs about these issues. The *who* of the process is significant--who develops the curriculum, who controls it, and how that is decided are compelling questions. Territoriality pops up as another area of tension, and it can have an effect on curriculum integration efforts as well as sequencing of course work. In light of recent calls for restructuring, another question arises: Given the current educational systems, are schools capable of delivering a comprehensive education to both those destined for higher education and those entering the workforce directly from high school?

When considering the curriculum as a product to be taught, Anderson (1995) observed in a review of curriculum reform efforts that teacher attitude plays an important role. Although depth over breadth is advocated, teachers sometimes believe that if they omit a topic that students might need at a higher grade level, the omission might prove detrimental to their students. Citing Stake and Easley (1978), Anderson referred to this as the preparation ethic, which they suggested is deeply ingrained in the culture of schools. Yet teaching for understanding means that some subject matter will have to be left out. In addition, although teachers may wish to provide a constructivist conception of learning in their classrooms, they may not have the skill required to teach in ways that enable the

learner to create his or her own knowledge. Also, teachers and principals may not have any local support available to help them learn this new way of teaching.

Curriculum development can be a rather haphazard process surrounded by impulsive decisions and influenced by what is currently in vogue at the time, rather than by systematically following theoretical principles (Tanner & Tanner, 1980). This observation certainly has merit, but it fails to address one of the main causes for the predicament— outside social and political pressures.

Concluding Comments

Traditional models of curriculum design present more similarities than differences. These models generally include a plan for identifying learner needs, articulating curriculum intentions and instructional strategies, assessing student learning, and identifying resources. Within that context the models place an emphasis on different dimensions in the process. Curriculum design approaches as described in books and professional journals take on a linear look, even when the authors frequently provide a disclaimer that curriculum work is anything but linear. In practice, educators, including teachers, principals, and curriculum specialists, generally work together to develop specific curriculum in content-specific disciplines. This takes place in face-to-face meetings. The work requires time, knowledge, skills, a sense of collaboration, leadership, planning, and administrative support. For informing practice the models are useful as planning tools but do not always provide a realistic picture of the curriculum development process. In addition, researchers and authors generally do not even speak to some of the very knotty issues—the "grit" of curriculum development work.

The whole specter of time is not adequately addressed, including both release time for teachers and the incredible amount of time it takes to develop curriculum units. Further, curriculum leadership as an important element in the planning and support processes receives scant attention, with leadership more often approached from a global school improvement perspective. There are layers of leadership in curriculum design, including that provided by teachers, principals, curriculum specialists, superintendents, and boards of education. The lack of leadership or strong leadership in any one or all of the noted areas has an impact on the ultimate outcome of curriculum development. Internal politics also influence the process. Other environmental issues such as school funding, population declines and increases, staff turnover, and construction projects also have an impact and receive little mention in the literature.

Tensions abound in curriculum development. The who, what, where, why, and when questions are the cause of much discussion and debate. These issues are also subject to political and social influences, all of which can have an effect on the curriculum development process and ultimately its content and focus. Through the present study the researcher considered the impact that electronic communications has on the curriculum development process, the tensions that exist, and the benefits of use. The next section of this review provides an overview of the literature on CMC.

Computer Mediated Communications

Introduction

Computer technology offers the possibility for educators to communicate electronically. Although this could initially appear to be a rather straightforward

circumstance, the dimension of electronic communications raises complex issues for individuals, groups, and organizations. In this section of the literature review, the focus is placed on the impact of CMC on individuals and groups, the tensions created with its use, and the implications for curriculum development practices.

Some of the terms that are introduced in this section are not commonly used or may have various meanings. Therefore, it is appropriate to begin by providing a few definitions.

Asynchronous communication: Communication in which interactivity can be delayed. The time between the creation of text and response is flexible and could range from minutes to weeks, or longer.

Computer mediated communication (CMC): Communication between individuals or groups through the electronic medium of a computer. This could include electronic mail, electronic conferencing, and listserv applications. In this study, CMC generally refers to e-mail communication.

Digital literacy: "The ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers" (Gilster, 1997, p. 1). It encompasses the cognition of what is seen on the computer screen when using that networked medium.

Electronic discourse: A form of interactive electronic communication, "using two-directional texts in which one person using a keyboard writes language that appears on the sender's monitor and is transmitted to the monitor of a recipient, who responds by keyboard" (Davis & Brewer, 1997, p. 1). Electronic discourse has elements of both a spoken and written language. The focus is on the use of language.

The use of technology is increasing rapidly. From newsgroups and listservs on the Internet, to conferences and bulletin boards, computers present numerous avenues for communicating electronically. Currently, the most common form of electronic communication occurs via electronic mail, e-mail, which offers the ability to instantly send a message and the luxury of responding when the opportunity presents itself. Estimates of the size of the Internet are problematic because no central organization keeps tabs on those numbers. Estimates of Internet users range from 5.8 million to a whopping 42 million users in the United States alone (Gilster, 1997). Currently, approximately 40% of the workforce uses electronic mail (Gwynne & Dickerson, 1997). Using digital technology, or being digital, will change the nature of mass media from a process of pushing information at people to one of allowing people with computers to pull information together (Negroponte, 1995).

Computers can do things for users as well as to users. People increasingly look to computers for experiences and information that they hope will affect their lives, and can cause old boundaries to be renegotiated (Turkle, 1997). Yet, cyberspace is a territory of contradictory claims in that it represents the potential both for unifying and for fragmenting. This points to the contemporary ambivalence toward technology (McKie, 1996).

Electronic communication allows for quick and inexpensive methods to find constituencies and mobilize them (Center for Media Education, 1995). An example of this can be found in a 1994 congressional race. An on-line campaign was waged to spread the word about particular grievances with Tom Foley (D-WA) by supporters of his opponent. In the process, they enlisted a cadre of online volunteers to assist with the opposition plan.

This provided people with a way to become personally involved in the political process. Beyond this example, electronic communication has many implications for individuals, groups, and organizations.

With computer networks, the potential exists for schools and teachers to share resources. Local and administrative databases, textual information, and school materials can be loaded on a central server, and thus reduce or even eliminate the need for duplication of materials. In addition, intellectual resources held by a school district can be disseminated and shared easily with other districts. Resources available through research centers and universities also become more easily accessible.

Implications of CMC for Organizations

Computer networks will allow organizations to create new and different organizational structures as well as new connections between and among groups. CMC allows people to by-pass traditional gatekeepers in organizations and provides direct access to information. For example, it is now possible for executives, once the members of an exclusive inner circle, to receive electronic communications from customers and front-line staff. Translated to the world of K-12 education, this means that the superintendent of schools could receive e-mail from bus drivers, parents, custodians, students, and staff. This presents a shift from one-sided communication that can be found in traditional top-down organizations, to various forms of interactive communication (Hunt, 1996). Computer-based communication also allows individuals to go to the source of information in a timely way rather than wait for the information or have it sifted through another person. The notion that knowledge is power is one of the major purposes

for universal public education in a democracy. Computer technologies take this principle to a new level of meaning by making information far more accessible. Sproull and Kiesler (1992) suggested that, in an electronic environment, "it's not who you know, but how you know that makes you a success" (p. 26).

Gwynne and Dickerson (1997) maintained that CMC has the potential to transform an organization by leading to changes in how people interact, identify with the workplace, and think about their work. They suggested that a significant impact of CMC may come from changing patterns of organizational interactions. Positive aspects of these changing patterns in organizations could include increased communication among different work groups, the convenience of asynchronous communication, and perhaps opportunities to save time. An example of one of the changes in the workplace brought about by CMC was provided in the September 26, 1999, edition of the *Detroit News*. The headline read, "Ford hit by e-mail protest." Salaried workers at some Ford Motor Company plants were organizing an e-mail campaign to voice their concerns to upper management. A spokesperson for the automaker indicated that they had an open communications policy, encouraging workers to express opinions to their managers or senior management.

Electronic communications can also create problems requiring computer policies and formal guidelines for appropriate and inappropriate uses of an organization's computer system (Lissy, 1990). Gwynne and Dickerson (1997) provided an example of a potential problem, noting an experience of Charles Wang, Chairman of Computer Associates, International. In his company, managers were receiving 200 to 300 electronic messages a day from customers and colleagues. People stopped talking to each other face to face, even to those in the next cubicle. Instead, they sent e-mail messages.

Kollack and Smith (1994) found that communication via computers could create a new social situation with powerful effects on social and organizational relationships. They suggested that CMC may increase social posturing but may also ease hierarchical status in power relationships. They further suggested that there is a decline in politeness and concern for others when using electronic communication in comparison with other forms of communication in an organization. Finally, they posed the possibility that CMC can have a double edge. Many of its central qualities make it easier to cooperate, but also to behave in a selfish manner.

Electronic Groups

In controlled studies on the behaviors of participants in either electronic or face-to-face groups, Sproull and Kiesler (1992) found that CMC constitutes a relatively franker form of discussion. Less audience awareness is shown by those communicating, in that the audience is not immediately present, may be unknown to the communicator, and an electronic message can be quickly written and sent without much thought. Sproull and Kiesler also found that if a decision requires group consensus, an electronic group may have to work harder to reach it than comparable face-to-face groups because there is an inclination for electronic groups to consult more people, thereby increasing the number of alternatives considered. In addition, Sproull and Kiesler discovered that the members of an electronic group tend to discard faulty reasoning that would have been accepted if offered by a personable member in a face-to-face group, electronic discussions may result in riskier choices, and members may experience more conflict in solving problems.

The dynamics of face-to-face groups are usually similar and somewhat predictable across groups. According to Sproull and Kiesler (1992), electronic groups are less predictable, can receive multiple inputs because communication is asynchronous, and provide for participation that occurs more equally. They further noted that, because it is harder to read status using electronic communication, high-status people do not necessarily dominate discussions. These researchers studied the difference between two forms of discussion: Anyone could talk first versus the high-status person talks first. They found that when anyone could talk first, the influence of the high-status individual declined. This meant that lower status individuals who perhaps possessed more knowledge could present their suggestions initially—a useful scenario when the person with the most status or power is not the most knowledgeable person in a work group (Sproull & Kiesler, 1992). Another positive feature of CMC as it relates to groups is that it offers the gift of time to ponder and to frame thoughts. Further, CMC creates a written record that can be referred to at a later date.

Sproull and Kiesler (1992) also noted that CMC is not a substitute for face-to-face or written forms of communication. Rather, it offers the possibility of enhancing the traditional modes of communication. They observed that it makes sense to create an electronic group when an existing group has little opportunity to meet face to face.

Riel and Levin (1990) reported that network groups can serve as a source for teacher learning and project development, but they noted that when such an electronic community is planned, it requires structure and should serve a real purpose. Further, to be most effective, the electronic community needs to be more efficient than other forms of group interaction, represent a shared set of beliefs or goals, and include a facilitator. The

role of the leader or facilitator is crucial to the endeavor. In addition, access to required technology should be easy and efficient. When networked groups are formed for the purpose of project development, face-to-face meetings should be held early in the process as a means of gaining commitment to the project (Sproull & Kiesler, 1992).

In their study of the success and failure of computer networking in relation to building electronic communities, Riel and Levin (1990) compared three networks designed to provide professional growth for teachers. Their analysis revealed the importance of the role of the group leader in organizing tasks and responding to group needs. They also identified the need for organizational structure as an important component in building an electronic community. Without structure, networked communities fail. In this regard, the authors noted that it is unrealistic to expect that teachers will simply share their knowledge with one another in an open discussion format without any focus, guides, or structure (p. 157).

In their book *Net.gain*, Hagel and Armstrong (1997) discussed the effect of electronic communities on businesses and on markets. They posited that the most important result of an electronic community may be its impact on the way that individuals manage themselves. Electronic groups will enable individuals to seek out colleagues in search of teamwork, or customers in search of products. From a business perspective, Hagel and Armstrong suggested that the keys to maintaining successful electronic groups over time include the abilities to aggregate members, retain them, and encourage them to make transactions. In studies based on field research by Rand Corporation, Bikson and Eveland (1990) found that computer mediated groups tended to show less hierarchical differentiation and broader participation than traditional groups, in addition to fluctuating

and situational leadership structures. The ability to communicate through an asynchronous medium diminished the problems posed by time and space that are apparent when working in a traditional group.

Issues of Gender

Whether or not computers offer the possibility of a more democratic form of communication is cause for some debate (Bikson & Eveland, 1990; Herring, 1993; Hunt, 1996; Turkle, 1997). There are characteristics of CMC that make the area fertile ground for democratic exchanges. Individuals have a variety of ways to access computer technology through home computers, at universities, in public libraries, and even in coffee shops, and thus can connect and communicate with folks all over the networked world. In addition, because identity can be obscured, one can eliminate the social context assigned by personal identity. Although this may result in a less personal communication, the result could be exchanges more focused on the content of a message than on the author of the message. Further, because CMC lends itself to more openness or even outlandish behavior, it has the potential to break down traditional hierarchical structures for communication. Because it is harder to read status cues in electronic messages than in other forms of communication, high-status people do not dominate the discussion in electronic groups as much as they do in face-to-face groups (Sproull & Kiesler, 1992). In a 1987 study, McGuire, Kiesler, and Siegel found that when a group of executives met face to face, the men were five times more likely than the women to make the first proposal. When the same groups met electronically, women made the first proposal as often as the men did.

The preceding example suggests the possibility that electronic communication offers a more democratic means of communication. This conclusion was not borne out in the results of research conducted by Herring (1993), who studied the online responses of male and female participants in two electronic bulletin boards. Her results revealed significant differences between male and female participants, the most striking of which was the discrepant level of participation between males and females. Women sent shorter, less frequent messages, which received fewer posted responses. In addition, a minority of males dominated and responded in adversarial and confrontational ways. Herring concluded that the result of this style of response was for women to participate to a lesser degree, thus avoiding both conflict and the lack of response to their postings.

In a study of text-based virtual-reality environments, Cherney (1994) found that women tended to display more affection toward others, whereas men tended to use more violent imagery during conversation. Davis and Brewer (1997) found that, during CMC, males entered into discussions by claiming authority first and then moving to affiliation, whereas females began with affiliation and moved to a stance of authority based on text and past action. Also, females tended to present elaborate explanations for their claims, whereas males made claims as statements.

Electronic Discourse From a Linguistic Perspective

Electronic discourse is both a spoken and a written language. The written form is speech, but it differs from conventional spoken language, while the text differs from written language (Davis & Brewer, 1997). It has elements of both a spoken and a written language, but the focus is on the use of language.

Davis and Brewer (1997) studied electronic discourse from a linguistic perspective, suggesting that in electronic discourse the writer is a reader, a writer, and a thinking communicator. They concluded that in this form of discourse the flow of conversation is altered because it is asynchronous, giving the communicators the ability to read postings on their own time schedule. However, the flow of conversation can be maintained through repetition, shared cultural knowledge, punctuation, and emoticons (capitals, smiley faces) signaling humor, irony, or intensity.

Davis and Brewer's (1997) study of how student writers deal with language when they participate in electronic conferences offered a number of interesting conclusions. They submitted that electronic discourse furnishes a venue for shy or intimidated individuals to engage in discussions and to exchange ideas. It also offers writers the opportunity to explain their work, unlike traditional text, in which the written word can be misinterpreted. Yet, Davis and Brewer suggested that misinterpretation abounds within electronic discourse, but in a different way. Because visual and auditory contextual cues are absent, the opportunity to hear voice inflections and nuances, and visual signs such as leaning forward or smiles or even a raised eyebrow–cues that have the ability to soften or strengthen the language they accompany–are not observable. Much of our understanding of linguistic meaning and social context is derived from these social cues. Although verbal face-to-face communication can result in these same misunderstandings, they occur with less frequency than those experienced in electronic discourse. Hughes (1985) suggested that the effectiveness of verbal face-to-face communication is due in part to its partner, nonverbal communication, or "social-pragmatic" language (p. 39).

With electronic discourse, participants compensate for the lack of social cues by providing verbal text that describes physical cues, and emoticons as mentioned above. In studying communication on Internet Relay Chat (IRC), Reid (1996) discovered that the users of IRC developed measures that helped deal with lack of context and markers of their common culture by devising systems of symbols and textual significance to ensure that they understood each other. They also developed social sanctions to punish users who disobeyed the rules of etiquette for their system. Davis and Brewer (1997) indicated that the elements of humor, sarcasm, denial, support, and often underlying communicative intention are lost in electronic discourse. Although emoticons are used, they cannot offer the same information or nuance as can be conveyed through face-to-face communication. Thus, electronic discourse alters the linguistics of those communicating through it.

In conclusion, electronic discourse, like any other use of language employed by people in interaction for the purpose of making and sharing meaning, is replete with its formulas and rules, such as repetition of words or phrases and the use of emoticons. Individuals are able to alter their own linguistic patterns to participate in electronic discourse, still maintain their own styles, and maintain their linguistic patterns and styles across topics. Therefore, electronic discourse as an aspect of language and a linguistic entity is as complex and as varied as the individuals communicating through it–just as in face-to-face communication.

Summary and Implications

The literature reviewed for this study revealed that CMC can facilitate group interaction in ways that are qualitatively different from that of other modes of

communication. It has the potential to create and maintain group interaction among people separated in time and space. Because CMC is an asynchronous form of communication, it allows for groups of people to respond to issues, ideas, and projects at their convenience. It also has the potential to reduce hierarchical structures in groups that may inhibit participation. These characteristics have significance for a project such as the K-12 Education in Philanthropy project because participants are geographically separated, are practicing teachers with tight schedules, and teach at various grade levels that to some educators represent a hierarchy.

Although the research suggests that there is value in electronic discussions, it would be injudicious to believe that electronic groups are valuable in all circumstances. Face-to-face meetings are especially important for initial meetings and to form alliances (Sproull & Kiesler, 1992). Also, if a quick decision is required, an electronic group may not be the best venue for making the decision because it may take longer to reach agreement. Further, the potential for misunderstanding increases in an electronic group because of the lack of the contextual clues that shed light on the meaning of words. As McKie (1996) pointed out, CMC can assist in both the unification and fragmentation of groups.

Research on the use of CMC as a means to connect individual developing curriculum is reviewed in the next section. This is the point where CMC meets curriculum design.

The Intersection of CMC and Curriculum Development

Introduction

The Internet provides opportunities for educators to participate in collaborative curriculum design projects, offering an avenue for working together that would otherwise be unavailable. Only within the past decade, however, have researchers and practitioners begun to explore the topic of CMC as a method for enhancing the curriculum design process. With the exception of the sciences and mathematics, a paucity of research has been undertaken that considers the effect of this form of communication on the development of a total curriculum or curriculum units. The research that does exist often considers implementation of previously developed curriculum by networked teachers or groups formed for professional development purposes.

Networked Projects

As part of the TERC Working Papers series, Weir (1992) researched networks that link schools across the globe. TERC is a nonprofit research and development organization committed to improving mathematics and science learning and teaching. A recent theme of their work involves the role of telecommunications in triggering and supporting educational change. Funding sources are typically the U.S. Department of Education and National Science Foundation Grants. These networks were pulled together for information sharing and professional development, and not for the purpose of designing curriculum. However, the findings offer useful information relative to factors that affect network involvement.

Weir (1992) suggested that network exchanges offer an opportunity for collaboration and a framework for cooperative learning. A portion of this study contrasted patterns of teacher participation in two telecommunications projects, the Science Teachers' Network, administered by the Harvard Graduate School of Education, and the TERC Star Schools. Both programs offered teacher support and development. However, the TERC Start Schools provided an integrated program that linked technology, a developed curriculum, and teacher support. In the TERC Star Schools, teachers reported that their network use was restricted because computers were only available at certain times and in certain locations. This required that teachers travel to a site to get on-line, thus diminishing their frequency of use. An additional problem for Star School teachers involved the amount of time required to participate in the activities. A number of teachers dropped out of the project due to lack of time. In the Harvard Science Teachers' Network, it was determined that having a computer at home significantly increased rates of logging on, reading, and writing.

In addition, Weir (1992) found that, when offered the opportunity to participate in an electronic community, some teachers participated actively, whereas others did not. She suggested that benefits to participation included increased collaboration throughout the educational system. Star School teachers reported the use of new kinds of materials and new classroom practices as a result of their involvement in the project. Network communication in both projects appealed the most to those teachers who were more professionally isolated. Further, teachers tended to read more than they wrote in networked communications. Weir also noted that benefits to students were reported to be significant by the Star School teachers. Interview information obtained from the students

revealed that they enjoyed having emphasis placed on their own knowledge and studying topics relevant to the outside world.

In their review of the use of participatory design in the implementation of networked learning, Silva and Breuleux (1994) contended that networks can be seen as tools capable of allowing educators to communicate, share, and access valuable knowledge. One of the benefits of the Texas Education Network noted by Stout (1992) included the potential for greater collaboration between K-12 educators and postsecondary educators. In their survey of networks in schools boasting high technology, Honey and Henriquez (1993) reported that educators listed less isolation as one of the benefits of using the system. The authors suggested that, through computer networks, greater opportunities for professional support and growth are possible, and more equitable access to and dissemination of resources for staff development can be guaranteed.

Noting that since different networks have different goals and criteria for measuring success, Weir (1992) identified a variety of general factors (see Figure 2.1) that are involved in predicting the success of a networked project. Ease of access to the network emerged as a crucial factor, along with providing one that is efficient because teachers do not have time to figure out convoluted systems.
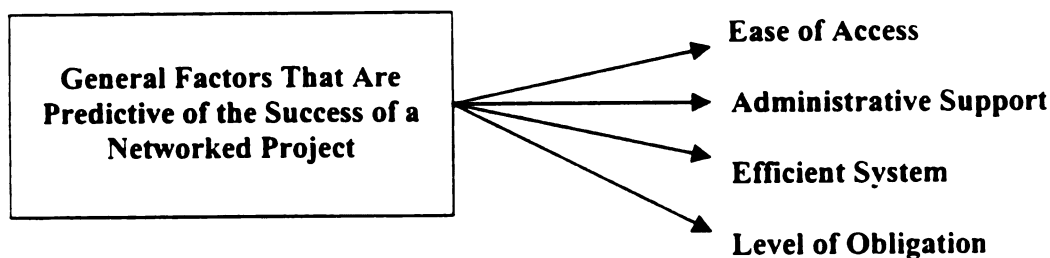
Figure 2.1: Success in a networked project (Weir, 1992).

Riel (1990b), who found through a study of four models of educational

communications that ease of access determined how regularly a teacher checked electronic

mail, supported the importance of ease of access. Weir further found that the level of

obligation the teacher felt to use the system regularly affected teacher participation rates,

as did time available for the teacher to fulfill participation requirements. Support from the

school administration was stressed as a significant factor for ensuring the physical

implementation of the network system because a teacher needs ready access to a

computer, a modem, and an available phone line in order to easily make use of a

networked system.

DiMauro and Jacobs (1995) studied the LabNetwork project, which supported a

network space for teachers to reflect on practice in the sciences. LabNetwork was

designed to create and support a nationwide community of practice using a

telecommunications network. An important finding from this study has relevance for

those in the initial planning stages of a networked project. DiMauro and Jacobs suggested

that designers include the prospective users in the creation of the network when building

an electronic community. They further stressed the importance of beginning with a

particular purpose, a clearly articulated pedagogical perspective, and a common

understanding of the expectations for the participants of the network. In addition, the

researchers indicated that the involvement of a leadership group is useful for gathering

feedback on the networked project and establishing group needs. Riel (1990a) also

pointed to the importance of leadership when educational settings provide computer

networks. She further indicated that attention must be paid to dimensions of group

organization, task definitions, and group dynamics.

Another networked project, the Alice Testbed, is one of four National Science Foundation-funded testbeds designed to demonstrate the educational potential of telecommunications. Network Science, a feature of Alice Testbed, promotes collaborative science inquiry in a networked environment. Through Network Science, geographically distributed groups of students solve science problems via technology linkages. In addition to studying collaborative inquiry, the Alice Testbed also investigates the scalability of Network Science, determining steps necessary to provide educational telecommunications support in math and science to teachers and students.

Feldman and Nyland (1994) studied Network Science in its initial months of operation. They raised a variety of issues relevant to curriculum development in a networked community. The writing of the curriculum itself presented certain difficulties. Some of the writers, although experienced in curriculum development, were not familiar with computer technology or the software used. For example, pieces of the writing required the ability to create data templates for graph and map displays, which were difficult for inexperienced computer users. Further, the design for submitting data was not sufficiently flexible, which ties in with suggestions noted above that were offered by DiMauro and Jacobs (1995) to include participants in project planning and to have access to a leadership group for feedback.

Coulter and Feldman (1995) offered exploratory research into experiences of teachers participating in the first year of EnergyNet, a telecommunications-based interdisciplinary science curriculum project. Nineteen teachers from 17 schools in Illinois participated in the EnergyNet project. These secondary teachers were charged with implementing a science curriculum that had previously been developed. The goal of the

research was to identify factors that impeded full implementation of the curriculum. Through an interview process, Coulter and Feldman categorized a variety of factors of significance affecting program implementation, paying particular attention to the context in which teachers work. These included factors generic to teaching, program factors, and technological factors, which are depicted in Table 2.1.

Table 2.1: Factors impeding curriculum implementation in a networked project.

Factors Generic to Teaching	Program Factors	Technical Factors
Content coverage	Top-down recruitment of teachers	Software problems
Competing demands on time	Lack of adequate technical training	Lack of computer access
Resistance to requesting technical assistance	Curriculum intended for those with computer skills	Inadequate technical support

Source: Coulter and Feldman (1995).

Factors generic to teaching that impeded curriculum implementation included the requirement to cover the content in the regular curriculum and therefore not having enough time for the project. Competing demands on their time for such activities as other new programs, new governance structures, and student teachers were additional factors. Finally, there was a hesitancy to request technical assistance exacerbated by the lack of a technical vocabulary. Program factors included the problem that recruitment of teachers was typically top-down from the administration, an approach that resulted in diminished enthusiasm on the part of some teachers. The lack of adequate technical training for the teachers was a real issue, as was the fact that the curriculum was written by nonteachers and was intended for an audience with computer network experience. Technological

identified by Coulter and Feldman (1995) included software problems, the lack of computer access, and inadequate technical support. In this regard they stressed that projects need human support as well as well-designed software.

In light of the problems experienced in EnergyNet's first year, Coulter and Feldman (1995) made a number of practical suggestions. Involve project partners in the early stages of planning; recruit teachers from the bottom up; provide adequate technical support staff; build a reason for teachers to contact technical support staff; provide training for teachers with no previous computer experience; make the software easier for the teachers to use, and phase in the implementation plan for the project; make sure equipment is set up and working before the project begins; and do not rely on e-mail to maintain communications with teachers new to technology.

Factors That Affect Network Use

In a 1995 study reviewing research on the use of computer networks, Eurich-Fulcer and Schofield identified issues that play a significant role in shaping patterns of wide area network (WAN) use within the K-12 education arena. They criticized previous studies on network projects for not identifying the criteria used to define a project as successful. They suggested that the success of a networking system should be gauged not only by the frequency of its use, but also by user satisfaction and goal attainment. Therefore, from their review of networking studies, the authors offered insights into circumstances affecting participant use, as well as those factors that influence user satisfaction and goal attainment.

Eurich-Fulcer and Schofield (1995) explored three sets of issues that affect WAN usage in a number of K-12 education projects (see Table 2.2). They found that *Technical and Logistical Circumstances* had the potential to inhibit or strengthen user involvement. How easy the system was to use and its reliability emerged as important factors that influenced usage. Technical writing, as well as technical support, was found to be vital to implementation. The authors noted a study by Castle, Livingston, and Trafton (1990) which suggested that training on the network is the factor most associated with facilitating network use. Whether or not people have access to computers and their availability has an obvious effect on use. Convenience and time available are added dimensions to this circumstance. In a study of the Principals' Computer Network, Drayton (1993) found that the main problem inhibiting computer use was the amount of time available to principals to gain the requisite skill necessary to navigate the network. Eurich-Fulcer and Schofield also pointed out that networks are moving targets that evolve over time, particularly because resources affecting their use can change daily and are unpredictable.

Table 2.2: Factors affecting WAN usage in schools.

Technical and Logistical	Attitudes and Characteristics of Users	Social and Organizational Context
• Ease of use	• Computer anxiety	• Changes in social context
• System reliability	• Computer experience	• Structural & organizational norms
• Training & support	• Gender	• Information access & freedom
• Access & availability	• Motivation	• Organizational commitment & support
• Time issues		

Source: Eurich-Fulcer and Schofield (1995).

The second set of factors likely to affect network use as noted by Eurich-Fulcer and Schofield (1995) involves the *Attitudes and Characteristics* of the user. Users' attitudes and anxieties about computers may be influenced by their previous experience and training in computer use. Motivation to use the technology may be linked to what Rogers (1983) referred to as a perceived advantage of use, such as the capacity to do something faster and better than before. Along with this, gender may play a role in computer use. Eurich-Fulcer and Schofield referenced a variety of studies suggesting that females may be less likely than males to use computers.

Finally, Eurich-Fulcer and Schofield (1995) identified *Social and Organizational Context* factors resulting from the culture of schools that can have an impact on network use. They suggested that because CMC has the potential to break down hierarchical barriers, it could threaten the status quo. Another issue here involves the organizational structure of schools with classes broken down into small blocks of time. They indicated that a related element is the traditional school culture that, for the most part, determines curriculum content and determines time schedules. Tied to this is the notion that a defined type of information—generally factual—is the currency of knowledge exchange in schools. Information available through a wide-area network has the potential to expand this knowledge beyond fact. A further factor related to the organizational context of schools is the importance of administrative support. Eurich-Fulcer and Schofield found that to the "extent that network use is not supported by the top level of an organization, computer networking will fail to be used broadly and deeply" (p. 218). Incentives such as monetary rewards, professional recognition, and opportunities for training are ways in which administrative support could be evidenced.

Conclusions From the Review of Related Literature

This review of literature related to traditional curriculum methods, CMC, and the use of electronic communication for curriculum development and collaboration yielded various themes that shed light on the current study. The process of developing curriculum is an exercise that requires time, teacher knowledge and skill, and a sense of collaboration. Leadership and administrative support are two elements important to effective planning and follow-through. Traditionally, curriculum development efforts have taken place in face-to-face meetings, and have provided an arena for working through the tensions infused in the process. The who, what, where, why, and when questions of the curriculum are subject to social and political influences, with territoriality posing a further tension. This literature review revealed that the issues of time, environment, and leadership do not receive adequate attention in current research on curriculum development.

The literature on CMC indicates that this form of communication has the potential to create and maintain group interaction among people separated in time and space. Important to this is the fact that electronic communication is asynchronous, allowing individuals and groups to respond at their convenience. CMC also has the potential to reduce hierarchical structures in groups, thus allowing for more participation from members. There is some support for the concept that electronic communication offers a more democratic environment than other forms of communication. However, results of studies on gender have shown differences in levels of participation and styles of responses between males and females, with males dominating and being more confrontational. Finally, from a linguistic perspective, electronic discourse is considered both a spoken and a written language, containing elements of each. It is also a mode of communication open

to misinterpretation because it occurs without the contextual clues found in face-to-face conversation that help frame intent. Thus, although electronic communication can assist in bringing groups together, it also increases the possibility of misunderstandings.

Even though the reviewed literature on the use of CMC in curriculum design is sparse, a number of findings have relevance here. Technical and logistical circumstances, such as ease of computer system use and reliability, have an impact on participant use of computers in educational networks. Technical support and training are vital to group projects. Further, the attitudes and characteristics of users and social and organizational context factors can have an effect on CMC. In addition, the literature offers practical suggestions for planning projects involving electronic communication, including involving project partners in the early stages of planning, recruiting teachers from the bottom up rather than from the top down, phasing in the project over time, and offering technical as well as human support. Along with this, it is considered important to begin a project with a clearly articulated purpose and understanding, and to have the project built as a grassroots effort by including teachers in the planning process.

There is a gradualness to any new method or innovation in education. This may be particularly true for a technological innovation. It needs to be considered within the various contexts that help shape its creation and development. This review of related literature has considered various contexts and in doing so offered a point of reference on which to frame this study, a foundation on which to build a theory, and a basis for comparing research findings. The elements found in traditional curriculum design provided a context for viewing the curriculum development process used in the project that was studied, while participants' ideas regarding factors related to time, leadership,

and computer training are issues that received attention. This research fits well within the

growing body of knowledge about the effect that CMC has on individuals and groups and

provides an important contribution to the field.

CHAPTER III

METHODOLOGY

Introduction

This research examined the impact of CMC on curriculum development by geographically dispersed, practicing teachers. The participating teachers developed the curriculum as part of a special project focused on teaching the concepts of philanthropy and civic responsibility. The primary question of the study considered: What is the impact of computer medicated communication (CMC) on the development of curriculum by geographically dispersed, practicing teachers? Additional questions examined how participants used electronic communication; how CMC inhibited and/or enhanced curriculum design; those factors that impacted the frequency of use of CMC; the purposes for which participating teachers used CMC; the impact of the computer training and support on participant use of CMC; those factors that assisted or deterred participants from using CMC for curriculum development; and the role that CMC played in building a sense of community within a networked project. Further, implications of the study for policy, practice, and further research were explored.

This chapter details the methodological approach employed in this study, as well as a rationale for its use. The population studied and data sources are described, followed by data-collection tools and information regarding existing archival documents that were

analyzed. The method utilized for data analysis is discussed next, followed by confidentiality and ethical considerations, with limitations of the research concluding the chapter.

Methodological Approach

Ethnographic Study

This research employed an ethnographic approach, the design of which is consistent with the qualitative research paradigm. This includes an inquiry process for understanding a social situation or problem, building a story through the perspectives of the studied population, and conducting the study in a natural setting (Creswell, 1994). A qualitative design was useful for this study because it is exploratory and descriptive, places importance on context, and searches for meaning in the participants' lived experiences.

Ethnographic research requires an open-mindedness from the researcher and embraces a perspective that accepts multiple points of view. The ethnographic study is noted for its rich narrative descriptions and the technique of studying a topic or problem in a natural setting. Ethnographic studies are generally inductive, shaping ideas and theories as the study progresses. Few explicit assumptions are made at the onset, thus allowing for the development of ideas during the literature review and as the data are considered. These data are collected from an emic, or insider's perspective, a perspective that Fetterman (1998) acknowledged is at the heart of most ethnographic research. An etic perspective is called into play for an external, social-scientific analysis of the data. This approach is useful when developing a grounded theory because the theory emerges from the data in relation to previous studies and ideas.

An ethnographic approach enables the researcher to detail shared beliefs, practices, folk knowledge, and behaviors of a defined group of people (LeCompte & Preissle, 1993). Further, the approach allows the investigator to consider multiple data sources gathered over time and to focus on the participants' beliefs and perspectives. Key to ethnographic study is face-to-face interviewing with the participants of the study. This is especially useful for eliciting participants' perspectives regarding events and behaviors. Ethnographic interviews also help pinpoint the nuances of a culture (Marshall & Rossman, 1995). Concern for the cultural context is what sets ethnographic studies apart from other types of qualitative research (Merriam, 1998, p. 14).

This study began with a big-picture view of the curriculum project and the use of CMC, which became refined over time. The work of the researcher included sifting through, organizing, and categorizing a wealth of data garnered from observation, archival sources, and interviewing. This approach enabled the researcher to sort, compare, and search for patterns, in addition to describing scenes and events in detail that convey the meaning of the occurrence. Through descriptive narrative, the beliefs of the participants and staff unfolded. The goal of this approach, as noted by Fetterman (1998), is to develop a description that is representative of reality.

This researcher selected an ethnographic approach because it allowed for in-depth analysis of the topic studied, as defined through the words and behaviors of the participants. Embedded in this ethnographic research are deep narrative descriptions, which contribute to an understanding of the culture, beliefs, and ideas of the participants. Narrative descriptions served as an important data source for this research. In addition, the study was undertaken in a setting that is natural to the participants.

An ethnographic approach also allowed for the analysis of data through a variety

of methods, including focus group and individual interviews, as well as for the

consideration of archival information. The complexity of the project under study, along

with its fast-paced evolution and its unique characteristics, support the use of an

ethnographic approach as a suitable research methodology. Further, there is agreement

between the data-collection tools employed for this study and the characteristics of

ethnographic research. This alignment is depicted in Table 3.1.

Table 3.1: Characteristics of ethnographic studies aligned with data-collection
            methods.

Characteristics of Ethnographic Studies	Data-Collection Methods Used for This Study
Includes rich narrative description defined through the voices of the participants	Taped conversations made with key informants through focus group and individual interviews
Takes place in the context of a natural setting	Data collected at regularly scheduled meetings for project teachers
Acknowledges multiple points of view	Views collected from program participants, staff, outside evaluators, and archives
Allows for shared beliefs, cultural context, group behavior patterns, and nuances of the culture	Interviews and meetings held with project teachers and staff; archival data reviewed
Is an inductive process; ideas form over time	Interviews held and historical data reviewed over time
Includes identifying patterns through comparing and contrasting	Multiple data sources studied

The researcher employed a grounded theory approach (Creswell, 1994; Merriam,

1998; Strauss & Corbin, 1994), assuming an inductive stance in an effort to derive

meaning from the data and a relevant existing body of knowledge. The emerging theory is substantive because it was drawn from everyday experiences and has a usefulness to practice. A grounded theory and ethnography are happy partners in that a grounded theory approach includes a constant-comparative method for comparing one segment of data with another (Merriam, 1998, p. 18). Further, a major strategy for supporting the discovery of grounded theory is through a general method of comparative analysis of the data (Glaser & Strauss, 1967). A grounded theory approach also allowed for the development of a well-codified set of propositions using conceptual categories and properties. Ultimately, the researcher developed research categories and themes as a result of employing the constant comparison method, through which patterns were identified. These patterns were then arranged in relationship to each other in the building of a grounded theory. As noted by Glaser and Strauss,

> Joint collection, coding, and analysis of data is the underlying operation. The generation of theory, coupled with the notion of theory as process, requires that all three operations be done together as much as possible. They should blur and intertwine continually, from the beginning of the investigation to its end. (p. 43)

The Population and Data Sources

The K-12 Education in Philanthropy Project is a statewide project in Michigan sponsored by the Council of Michigan Foundations. A variety of donors from both state and national foundations have funded the project (see Appendix B). The purpose of the project was to develop a curriculum for grades K-12 on the teaching of philanthropy as part of our democratic tradition, and to distribute the curriculum to schools across the country and other parts of the world. The population studied for this research included the 43 practicing classroom teachers who were selected for participation in the project. A

deeper description of the participating teachers is provided in Chapter IV and detailed in Table 4.2.

The project staff members and consultants were also interviewed for this study to obtain their perspectives on the use of CMC as a tool when developing curriculum. The staff included a project director, a curriculum support person, and a secretary. In addition, an assessment consultant was under contract with the project, and technical training and support services were purchased through Michigan State University's Computer Center. A marketing specialist, who joined the project in early 1999, was not interviewed for this research.

All 43 teachers served as the sample population and as the major data source for the research. The three categories of data sources for the project are noted in Figure 3.1. Twenty-one of the teachers participated in the focus group interviews, a key data source. A second source of data included information provided by project staff and contracted support persons, who participated in face-to-face, individual interviews. These staff interviews helped the researcher further develop an understanding of the context in which the project took place. Existing archival information regarding participation in the project comprised a third source of data. These data sources included samples of e-mail exchanges, journal entries, application information, and a year-one evaluation made up of stakeholder interviews, round one of the teacher journals, and a survey of the teachers. The data were eventually triangulated to identify patterns, categories, and themes, and to discover inconsistencies in the information.

Focus Group Interviews

Individual Interviews   **Archival Data**
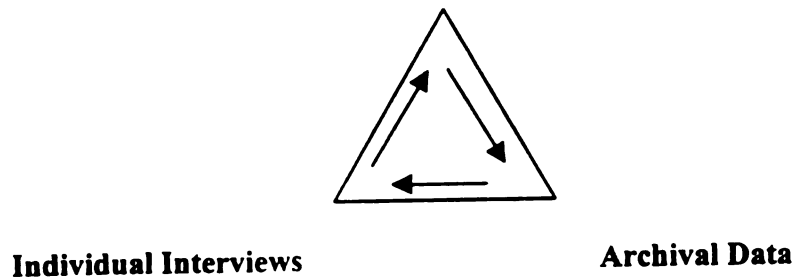
Figure 3.1: Data sources for the research.

Data-Collection Tools

As depicted in Figure 3.1, data for this study included information gathered

through a variety of sources: (a) focus group interviews with participating teachers, (b)

face-to-face interviews with project staff, and (c) document review of existing data

associated with the project. Before data collection began, the researcher obtained

approval from the University Committee on Research Involving Human Subjects

(UCRIHS) (see Appendix C).

Focus Group Interviews

Focus group interviews offered an interesting dimension to data collection because

of their emphasis on dynamic group interaction. The underlying tenets for focus group

interviews are compatible with a qualitative research design in that multiple views of

reality are accepted, they allow for interaction between the researcher and participants,

and they hold that the nature of truth is influenced by perspective (Vaughn, Schumm, &

Sinagub, 1996).

The focus group interviews provided an organized method for obtaining information on how and why people behave as they do, as noted by Folch-Lyon and Trost (1981). In addition, the focus group interviews allowed the researcher to understand a topic from the everyday knowledge of the user. Thus, the interviews served as an important tool for this ethnographic research. In this study the focus group interviews enabled the researcher, who had initial knowledge of the topic, to gain a far deeper level of understanding of the nuances and issues involved in the use of CMC in curriculum development. The interviews helped the researcher ascertain the why behind events and decisions. Further, the focus group interviews provided a great deal of information in a relatively short period of time.

Data gained through the focus group interviews added clarity and context to the questions of the study. The group setting allowed for probing with various degrees of give and take among the participants, leading to a more precise understanding of the project from the participant perspective. The focus group interviews served as an important tool for garnering the perceptions of the participants in the project. These perceptions were then tied back to the questions of the study. The perceptions of the project teachers also provided a basis for recommendations for organizing future projects of this kind.

Before the focus group interviews, the researcher developed a number of tools and documents (see Appendix D), including the following:

1. Focus Group Interview Protocol Script.

2. Focus Group Interview Questions.

3. Letter to Participants of Focus Group Interview.

4. Focus Group Interview Consent Form.

Probes for information relevant to the impact of CMC on curriculum development were contained in the focus group interview protocol developed by the researcher. Data collected through the focus group interviews served as the basis through which other data sources were considered. Because of the dynamic nature of focus groups, participants had the opportunity to think about and discuss issues and concerns along with other project teachers. The group setting itself may have encouraged reflective responses. These focus group interviews afforded the researcher an interesting look at group dynamics, bringing the investigator closer to the topic.

The focus group interviews were planned to elicit information important to answering the research questions. Particular importance was placed on:

1. How and why participants used electronic communication in curriculum design.

2. The challenges they faced in using CMC as a tool when developing curriculum.

3. What was helpful to them in using a computer-based communications system.

4. What inhibited the use of CMC for designing curriculum.

5. Their ideas and suggestions regarding the use of CMC when developing curriculum for future projects, for practice, and for educational policy.

Data from three focus group interviews were collected and analyzed for this study. Forty-three practicing teachers who participated in the K-12 Education in Philanthropy Project made up the pool of possible participants for the focus group interviews. The grade breakdown and number of participating teachers in each of the focus groups are shown in Table 3.2.

Table 3.2: Grade configuration of focus group interviews.

Focus Group	Grade Level	No. of Participants
Focus Group One	Grades 9-12	Six project teachers
Focus Group Two	Grades 7-12	Seven project teachers
Focus Group Three	Grades 2-5	Eight project teachers

The researcher met with the project director, secretary, and curriculum specialist to discuss the make-up of the focus groups. The intention was to make sure that the groups included teachers with a range (low to high) of expertise and level of involvement, and were representative of the larger group. As part of the K-12 Philanthropy Project, the participating teachers met face to face on a regularly scheduled basis. The focus group interviews occurred during one of the scheduled meetings. The 23 teachers who attended the May 1999 project meeting made up the sample for the focus groups. This group was carefully reviewed by the project staff to ensure that they were representative of the larger participant pool. Each teacher was assigned to one of three groups based on the grade level taught. Two groups were composed of secondary teachers: one of grades 7 through 12, the other of grades 9 through 12. The third focus group included elementary teachers of grades 2 through 5. Teachers in grade levels kindergarten, 1, 6, and 8 were not represented in the focus groups. Although not all grade levels were present in the focus groups, the participants included nearly half of the project teachers.

Face-to-Face Interviews

The face-to-face interview is one of four basic data-collection tools in qualitative research (Creswell, 1994). The interview is much like a conversation, but one with a

specific purpose and embodying a well-planned format. And, although there is planning involved, the purpose of the interview is to determine the participant's perspective, rather than being led by the researcher (Marshall & Rossman, 1995).

The researcher conducted in-depth face-to-face interviews with project staff members and consultants including the project director, the curriculum specialist, the project secretary, two members of the Michigan State University Computer Center staff, and the assessment consultant. Project staff members and consultants were selected for interviews because their responsibilities allowed them to view various elements of the project from clearly different perspectives. In addition, they were able to provide a broad view of the project. Because these project staff members and consultants had been a part of the project since its inception, they were able to offer historical information relevant to the study questions.

The researcher developed the following documents to be used for the individual interviews (see Appendix E):

1. Individual Interview Script.

2. Individual Interview Questions.

3. Letter to Participants of the Individual Interviews.

4. Individual Interview Consent Form.

The interviews focused on the following:

1. How and why project teachers used CMC.

2. What enhanced or inhibited the use of CMC.

3. Implications they drew regarding the impact of computer technology on curriculum design for practice, policy, and future projects.

4. How/whether the use of computers changed over the life of the project.

These interviews provided checks on what the researcher believed to be relevant and important to the structure of the project. The interview questions were linked to the major and subquestions of the study. The data collected were analyzed against the data from other sources to determine consistency, differences of opinion, and alignment in perceptions.

Review of Existing Archival Documents

Using archival documents as a data source is not much different from using interviews or observations in qualitative research, according to Merriam (1998, p. 120). Locating relevant materials was the first step. To this point, the K-12 Education in Philanthropy Project possessed a number of documents and materials that were useful for review and analysis. The archival documents that were reviewed included:

1. Participant applications to the project.

2. Samples of e-mail exchanges.

3. Michigan State University K-12 Education in Philanthropy Project Year One Evaluation: Baseline Survey, Stakeholder Interviews, Journal Round One.

4. K-12 Education in Philanthropy Project Journal Round Two.

5. K-12 Education in Philanthropy Project Journal Round Three.

6. Indiana University Evaluation of K-12 Education in Philanthropy Project.

The data found in the archival documents were considered for clarification of ideas, for obtaining descriptive information, to verify emerging ideas, and for comparative analysis. The teacher journals provided an especially rich source of information regarding

the teachers' feelings and ideas as they progressed through the project. Again, the focus of the archival data review was to determine answers to the questions of this study. Of particular interest was information related to the use of CMC for curriculum development, and participants' perceptions of computer technology as a tool in curriculum design. Implications for policy and practice emerged as an important outcome of the data gathered.

Data Analysis

A qualitative research design is an emerging design. In that context, the collection and analysis of data is a simultaneous process that is recursive and dynamic (Merriam, 1998, p. 155). To a great extent, how the data in this study were used and analyzed was defined by the information collected during the focus group interviews with the teachers and the face-to-face individual interviews with the staff, as well as the review of archival materials. With that in mind, the components of the data analysis are considered below:

1. The data analysis was conducted simultaneously with data collection and interpretation, as well as the narrative report writing.

2. The process of analysis included data interpretation that identified patterns, categories, and themes.

3. A coding procedure such as the one suggested by Tesch (cited in Creswell, 1994, p. 155) was developed to assist in determining themes from the data.

4. The information garnered from the data analysis is represented in display form as seen in Chapter IV, Figures 4.1 through 4.5 and Tables 4.4 through 4.6, as well as in Chapter V, Figure 5.1 and Tables 5.1 through 5.3.

5. The analysis and the results of the study are organized around the research questions identified in Chapter I.

Using the constant comparative method of data analysis, the researcher generated many categories and ideas from the data. The analysis included consideration of conditions, context, processes, consequences of particular actions, and interpersonal dimensions. No attempt was made to prove a universal concept or to present proof that one action caused another event. The researcher borrowed from the method suggested by Glaser and Strauss (1967), using four stages in the process:

1. Comparing incidents applicable to each category: This was accomplished by writing code words in the margins of the text of the data source.

2. Integrating categories and their properties: The code words were then assigned to categories on index cards.

3. Delimiting features: The categories were aligned and realigned, sifting out data segments that were tangential or unsubstantiated by another data source.

4. Defining a framework: The categories were further considered and placed in a framework (see Figure 1.2).

In testing one source of information against another through triangulation, the various data sources were used to corroborate information and illuminate the research questions. In addition, by triangulating the data, the researcher identified inconsistencies and sought to eliminate alternative explanations. Further, this method of analysis served to improve both the quality and the accuracy of the data analysis. As part of this process the data were continually compared and contrasted to ferret out consistencies and inconsistencies in the process of identifying patterns and themes.

In addition to triangulation, other strategies were employed to increase internal validity of this study. An expert panel, this researcher's dissertation committee, reviewed the material for comments and feedback. Tentative interpretations were shared with project participants and staff for a reality check on the interpretations. Finally, the researcher's views and biases were clarified at the onset of the study.

When employing a qualitative research design, the traditional idea of reliability can be elusive. Therefore, reliability in this case was thought of as suggested by Merriam (1998), in terms of "whether the results are consistent with the data collected" (p. 206). In this regard, to ensure that results were dependable, this researcher chose to triangulate the data, identify the researcher's relationship to the group and project studied, identify the basis for selecting participants in the focus groups and staff interviews, and present information and the process to an expert group.

Confidentiality and Ethical Considerations

All data gathered through the focus group interviews and the face-to-face interviews were taped and considered confidential. Members of the focus groups were given pseudonyms to protect their identities. This level of confidentiality was discussed in the letters to the participants and their agreement-to-participate forms (Appendix D). A graduate-level speech and language pathologist, skilled in taking language samples, was present during the focus group interviews to assist with note taking. That assistant did not know the participants, and provided all written materials to the interviewer upon conclusion of the focus groups. In the case of project staff, anonymity could not be granted because only one person held each position. Therefore, attempts were made to

include individual thoughts and perspectives in a broader context, where appropriate. However, their reflections are generally offered noting their position. The project staff and consultants were made aware in writing before the interview that anonymity could not be granted, but that confidentiality would be respected (Appendix E). The interview tapes for both the face-to-face interviews and focus group interviews were transcribed by the researcher and remain in the sole possession of the researcher. All interviews were voluntary, with no negative repercussions resulting from nonparticipation and no special rewards being provided to those who participated.

Limitations of the Research

This study was undertaken through a unique project, backed by considerable funding, and sponsored by people with a strong belief in their mission. The project was limited to the state of Michigan and to one particular endeavor, which might hinder the generalizability of the study. Another limitation concerns data collection and sources. Although the focus groups included 21 of the 43 participating teachers, the results may not be representative of the entire group. Further, there were no teachers in the focus groups from grades kindergarten, 1, 6, and 8. In addition, the researcher used existing data that were collected within the constraints of the project and not necessarily as rigorous research.

Although the researcher approached the study with an open mind, numerous years of experience as a principal and an assistant superintendent for instruction make up her cultural perspective. Further, the researcher has served on the steering committee of the project since its inception, and the project rents space at the Muskegon Area Intermediate

School District, where the researcher is the associate superintendent. These stated

conditions could influence the study in a way that would weaken the results.

CHAPTER IV

FINDINGS

Introduction

Purpose

This research was undertaken to examine the impact of CMC on the development of curriculum units by geographically dispersed, practicing teachers. The researcher investigated the circumstances and conditions by which CMC assisted and/or inhibited practicing classroom teachers working with colleagues throughout Michigan in the development of lesson plans and curriculum materials. Specifically, the lesson plans and units were and continue to be developed by teachers involved in the K-12 Education in Philanthropy Project, an initiative designed to create a K-12 curriculum in the teaching of philanthropy and civic responsibility.

Ethnography

As an ethnographic study, themes and insights are reported from the point of view of the participants. In this case, quotations from the participants and staff, as well as references to the identified factors that influence curriculum development in a networked project, are the supporting data provided in Chapter IV for the conclusions drawn in Chapter V. As noted in Chapter III and in Table 4.1, a variety of data sources were analyzed in relation to the research questions. The researcher triangulated the data

sources to substantiate comments and as a means to sift out data that had no other supporting documentation. In the process of analyzing the focus group and individual interview transcripts, journals, and survey data, the researcher assigned code words to significant phrases, sentences, or paragraphs. These code words were then grouped into categories, thereby developing themes. These themes are discussed in Chapter V along with Research Question 3. Research Questions 1 and 2 are discussed in this chapter.

Table 4.1: Data sources.

Type of Data	Source
Periodic written journals from the teachers over two years	Michigan State University K-12 Education in Philanthropy Project formative evaluation data
A written baseline survey	Michigan State University K-12 Education in Philanthropy Project formative evaluation data
Written application documents from the teachers	Philanthropy project archival data
Interviews with the project managers and staff	Individual face-to-face interviews
Interviews with teachers	Indiana University evaluation of K-12 Education in Philanthropy Project
Focus groups with teachers selected to represent the participants	Focus group interviews
E-mail exchanges	Sample of e-mail exchanges

Participants

Forty-three teachers representing both public and private schools participated in this project (see Table 4.2). Nearly half, 21 of the 43, teach in elementary grades kindergarten through 5. Six teach in grades 6 to 8, with the remaining 16 teachers working with students in grades 9 through 12. All of the teachers in the K-12

Philanthropy in Education Project have full-time teaching responsibilities in addition to their involvement in the project.

Table 4.2:   Participants.

Grade Level School Type	K-2 Public/Private	3-5 Public/Private	6-8 Public/Private	9-12 Public/Private
Rural	1	2	0	3
Suburban	3	2	3	10
Urban	2	11	3	3
Total	6	15	6	16

This is a skilled professional cadre of teachers. The teachers range in experience from 5 to 25 years, with most teachers falling into the 20-year range. A baseline survey, taken as part of the first-year project evaluation, conducted in the spring of 1998 (Silver, 1998) indicated that 67% of the teachers hold an advanced degree. The remaining teachers hold bachelor's degrees, with additional credits being earned toward an advanced degree. Twenty-two percent are using project involvement to earn graduate credit. Silver's survey further revealed that the majority of project teachers have had previous experience in developing new curricula, with 83% indicating two previous experiences and 33% indicating four or more experiences developing new curricula.

In the following discussion, Research Questions 1 and 2 are presented in turn, allowing the voices of representative group members to enrich the narrative.

Results From Research Question 1

What is the impact of CMC on individual practice?

Research Question 1a

How is the use of CMC different from other modes of communication, and how has it affected the use of these other modes of communication?

This section reviews the initial part of the first research question regarding how the use of CMC is different from other modes of communication. A component of this discussion is the effect CMC has had on other forms of communication. Ways in which CMC differs from other forms of communication are noted in Table 4.3. These were derived from the variety of data sources described in Table 4.1. Statements from the surveys, interviews, and focus groups are used to demonstrate the differences reported.

Table 4.3:   How CMC differs from other communication.

Computer Mediated Communication	Other Forms of Communication
Less personal than face to face	More personal because face to face
Asynchronous nature overcomes time and distance issues	Real-time, same location
Forwarding exact messages possible; messages are clearly in writing	Messages often are changed as a result of the human factor in communication
Lacks visual cues, so misinterpretations are possible	Provides visual and auditory cues that enhance nuanced understanding
Reduces the need for paper copies	Continues to need paper copies
Reduces the need for telephone conversation	Continues the need for telephone conversation
Information easily shared	Voice-mail (an alternative option) does not allow time for such messages
Reduces the number of meetings needed	Continues the number of meetings

Project teachers found CMC to be less personal than face-to-face communication. As one teacher stated, "It's a machine!" Yet, most teachers appreciated the asynchronous nature of CMC because time and distance are not factors in communicating electronically. One teacher explained, "I can use e-mail any time, and I have access to everyone!" Another noted, "I can respond at a time when I want." One fellow offered this analogy: "To me it's like this huge mailbox in the sky!" A number of teachers commented on the convenience of being able to receive and send messages at home after school. One high school teacher appreciated the informality of e-mail as well as that it saved time. Gwynne and Dickerson (1997) pointed to the convenience of asynchronous communications for work groups as well as the possibility of saving time. It was revealed in the staff interviews that new e-mail users often followed up their messages with a phone call to check if the message got through. As teachers became more comfortable with CMC, they did not make the follow-up calls. Not every teacher saw the asynchronous nature of CMC as a benefit. "Whoa! You don't have a voice . . . never know if messages go through. Are they getting it, or is it lost in cyberspace?" exclaimed one teacher in a focus group.

Innovation theory would suggest that this reaction, even the "whoa" statement itself, is indicative of an individual assuming a "resister" stance. Havelock (1973) wrote, "Many social systems also contain some members who assume the active role of resisters or critics of innovation" (p. 120). A simple orientation to the "notification of delivery" function in e-mail would solve the presenting problem voiced by this teacher. It would not solve any underlying resistance to the use of technology for communication.

CMC also differs from other modes of communication by offering the option of forwarding messages to others rather than duplicating the information through print or by phone. This provides a first-hand account versus a second-hand opinion. Teachers noted

that CMC is "just like writing or reading a letter" and thought that because there was a record, misunderstandings were reduced, as indicated by one of the middle school teachers: "It's more exact. You have it in writing in front of you versus having to interpret what they said on the phone." Sproull and Kiesler (1992) noted that with CMC there is a written record that can be referred to at a later date.

Although CMC does provide a written record, several project staff members noted that misunderstandings occurred through CMC because it lacks the social cues that are apparent in face-to-face communication. The curriculum specialist reflected in an individual interview, "Humor can be misinterpreted, especially something like tongue-in-cheek comments." When considering the nature of communication and the strengths and weaknesses of the written word, versus the face-to-face verbal communication, a number of issues arise. Body language in gesture, positioning, eye contact, energy level, and animation is lost in the written word. Verbal cues such as an underlying chuckle, raising or lowering volume, raising or lowering pitch, and vibrancy are also lost in the written word. Conversely, the speed of verbal communication, mental "lag time" in processing the spoken word, and communication misunderstandings from mixed verbal and visual cues often impede the clarity of communicating through the spoken word. These differences have been noted in the literature on CMC (Davis & Brewer, 1997; Reid, 1996; Sproull & Kiesler, 1992).

A significant effect of CMC pointed out by the project curriculum specialist was that it reduced the need for providing all materials in hard copy. Initially, all materials were provided in hard copy. After participants became more skilled on the computer, many communications and materials were shared electronically. The project secretary and

director also remarked that CMC had reduced the need for providing everything in hard copy.

CMC eliminated the need for frequent phone conversations. Because it is difficult to contact teachers by phone during the workday, both teachers and support staff saw this as a positive development. The project director said that early on in the project she was calling teachers at home at night. Now they e-mail back and forth. An elementary teacher pointed out, "E-mail can be better than voice mail because of the option to give very detailed and specific information. It also gives you the chance to clarify comments." Davis and Brewer (1997) submitted that CMC offers the opportunity for writers to explain their work, unlike traditional text in which the written word can be misinterpreted.

Through CMC, information can be shared and contacts can be made that clarify the purpose of a meeting, set plans for lunch, and assign tasks, for example. During the focus groups, teachers indicated that they appreciated receiving materials in advance of meetings that they would otherwise have received at the face-to-face meeting. The project secretary, who is in regular contact with participants, stated, "Because teachers share electronically, they feel that they know each other. This has enhanced their relationships."

During an individual interview, the curriculum specialist remarked that the use of CMC had cut down on the total number of meetings required: "Without electronic communication, it would be arduous. It would take a lot of the joy out of it. . . . We would have had to meet more often." Another perspective offered by the project director held that because the teachers were so frustrated with the technology when the project first started, the staff added more face-to-face meetings. She agreed with the curriculum

specialist, however, regarding the effect CMC has had on the total number of face-to-face meetings. She elaborated, "All the lessons have been sent and stored electronically. Without the computer system we would have had to meet, we would have had to use snail mail . . . it would have been impossible if we would have had to do it with paper."

A final point of interest that was raised in one of the teacher focus groups involved the conference calls. Conference calls were offered as another option for communicating. Although the calls were used by some of the teachers, conference calling waned because of limited involvement. Addressing the lack of interest in the conference calls, one of the elementary teachers stated that CMC had "killed the telephone conferences." Another teacher wrote in her journal, "I have not found the conference calls particularly helpful. It seems to me that for the most part the information provided could have been e-mailed more efficiently." However, a number of the teachers indicated that they were uncomfortable with the telephone conference format. "I didn't know when to chime in," one of the teachers stated. That could have added to the demise of the telephone conferences. This is a factor that was not determined through the present research.

The reciprocal relationship of CMC and face-to-face meetings. Both participants and project staff indicated that CMC enhanced the experience of face-to-face meetings, but the face-to-face meetings also enhanced CMC. Journal entries indicated that the face-to-face meetings "help to maintain the momentum of the program." Journalers described the group meetings, using words such as "essential," "crucial," and "valuable." This reciprocity underscores the use of CMC as a tool to enhance a process, not as a total replacement for direct and face-to-face interaction. In this light, CMC may also be seen as a tool that can build a sense of community during the curriculum development process. In

a study on facilitating collegial exchanges in computer-based conferencing, Katz,

McSwiney, and Stroud (1987) found that the network communications provided a channel

for communications that served to increase the teachers' professional contact beyond what

could be gained from face-to-face communications. The researchers further remarked that

it is important to provide opportunities for face-to-face interactions as a meaningful

ingredient to communicating on-line.

Summary. In summary, data culled through careful analysis of the journals,

written surveys, archival records, interviews, and focus groups suggest that there is a

relationship between CMC and other forms of communication. CMC has not replaced the

other forms of communication, but participating teachers and stakeholders identified

strengths as well as weaknesses when CMC was compared to other avenues of

communication.

Research Question 1b

For what purposes do participants use CMC?

This section explores the responses, as documented from the analyzed data

sources, regarding how the participating teachers used CMC. E-mail was the primary

communication vehicle and was used for editing, emotional support, requesting

information, sharing lessons, and research. These uses are depicted graphically in Figure

4.1. Two other forms of CMC, the list serv and the bulletin board, were not used as

frequently by the teachers.
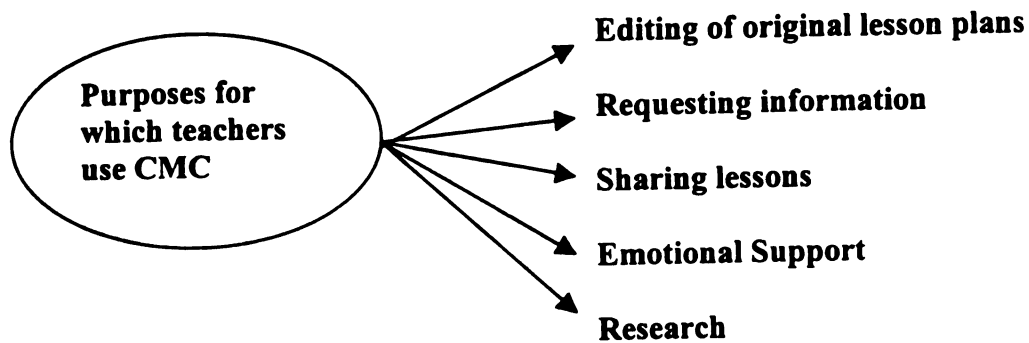
Figure 4.1: Purposes for the use of CMC.

E-mail. The teachers used CMC, in particular e-mail, for a variety of purposes, including editing original lesson plans, requesting information, sharing lessons, offering support to other members of the project, and conducting research.

Editing: The teachers and the curriculum specialist exchanged lesson plans for the purpose of review and editing. The curriculum specialist taught the teachers how to edit on-line and then send the lessons by e-mail. During the focus group interviews with the teachers and during the individual interviews with the curriculum specialist, project director, and assessment consultant, the use of e-mail for editing was discussed. One teacher stated, "We send our lessons to Terry. He is the one that taught me how to attach the lessons to my e-mail and how to edit the lessons." The curriculum specialist reflected, "At first they had problems; now they can format, exchange ideas, and edit their lessons, and send them back to me." The assessment consultant stated in an individual interview, "After a face-to-face meeting, the teachers reviewed the material and sent it to me by e-mail."

Requesting information: Information gathered through the focus group interviews, individual interviews, journals, and e-mail samples showed that e-mail was

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employed by the teachers to request information from the staff and from each other. The information requested ranged from inquiries about meeting dates and times to information about a particular lesson. A secondary teacher offered, "I use it [e-mail] to communicate with others in the project. I send messages to staff to ask about things we need to do in the project." A journal entry stated, "We receive e-mail regularly and it is up to us to use the e-mail to ask questions, make comments, etc. Whenever I have sent information or asked a question by e-mail, I have received a prompt response." Katz et al. (1987) reported similar findings in a study of science teachers, noting that the most frequent network exchanges involved seeking/offering information and responding. In her study of the AT&T Learning Network, Riel (1990a) found that teacher participants showed a greater willingness to request information electronically than teachers not on the network. Riel's work may have implications for curriculum development where it is important to seek out and request information in the updating and development of new curricular materials.

Sharing: Data gathered from the focus group interviews, samples of e-mail, as well as the individual interviews with the curriculum specialist, project director, and project secretary show that the teachers shared their lessons with others via e-mail. Indeed, the curriculum specialist required that lessons be shared electronically rather than by hard copy. Although both elementary and secondary teachers were most likely to share their lessons with the curriculum specialist, during one of the focus groups, the elementary teachers stated a willingness to share with each other also. In a different focus group, Joanne stated, "I send my lessons to Terry, not really to the other teachers in the project." Others in the focus group nodded at her remark. This supports the finding of Riel

(1990b), who suggested that the majority of interaction in a network project occurs between the moderator or leader and an individual teacher.

Emotional support: In journals, the e-mail samples, and the focus group interviews, the teachers stressed the importance of the support offered by the project staff. This support was regularly given over e-mail. The teachers also provided each other with such support, as was evident when the mother of one of the teachers was gravely ill. The emotional support was bounced back and forth over e-mail in an effort to shore up the teacher as she dealt with her difficult situation. In a study of electronic communities of learners, Weir (1992) noted the emotional support that teachers offered each other in the TERC Staff Schools project. Honey and Henriquez (1993) listed greater opportunities for professional support and growth as a benefit of using networks for communication.

Research: The teachers used CMC for research, as did the project curriculum specialist and director. E-mail was employed for contacting sources outside the project for information that could be useful in lesson development. Silva and Breuleux (1994) suggested that one of the important reasons for supporting collaborative networking projects is that intellectual resources found in research centers and universities become more easily accessible. Negroponte (1995) pointed out the effect that digital technology has on helping people pull information together. In addition to e-mail, the project web site provided a hefty list of reference sources for research purposes. One teacher commented, "I use it [CMC] primarily for finding information, research." Others in the focus group agreed that they also used CMC to help with their research as it is important to lesson development.

Summary of reported purposes for using e-mail: During the focus group interviews, the teachers suggested that there had been a change in how they used CMC since the project started, identifying skill with computers and overcoming technical problems as the reason. The following statements demonstrate the recurring themes in the surveys and interviews supporting each use of e-mail. Each use is noted in parentheses that follow the quotation.

Initially, few teachers used e-mail. One who did stated, "I was one of the first people to start using e-mail. My main goal was to find out where the project was going. . . . I e-mailed other teachers and got no response, so I stopped" (requesting information). Another participant indicated that at first he used the Internet for searches in the development of lessons (research). "Then, as we developed, I found it very useful to send ideas, lessons, the entire unit by e-mail to Terry and to Kathy and other administrators of the project" (sharing lessons, editing, requesting information). One of the university staff members providing computer support noted, "A number of them [the teachers] did not have e-mail before this project . . . so they started from not communicating by electronic means to actually using it. People are becoming more comfortable with e-mail. At first it was a lot of phone calls, but now it has been e-mails, when they want information and help" (emotional support, requesting information).

An assessment subcommittee within the larger group had worked together developing assessment tools. As part of this work, the group members were required to communicate electronically to share ideas and offer feedback. The assessment consultant imposed this structure, which served to increase electronic communication. Gerard, a high school teacher, noted, "Tom showed us how to critique each other's work on e-mail and

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how to change it and see comments" (editing, sharing lessons, emotional support). In addition, the project curriculum specialist required that lessons be sent to him electronically. Participants and other staff concluded that because of this requirement, the project teachers had to learn how to use e-mail and attach documents.

Electronic communication with the project staff provided an effective means of information exchange in real time. Twenty of the 21 focus group participants indicated that they had communicated electronically with each other and with the project staff (requesting information, sharing lessons). The member who had not used e-mail at all was one of four project teachers on the staff at a high school. She relied on the other three for her information and indicated that she had not needed to use the computer for communication purposes. She also stated that she did not have the time to learn to use the computer and felt no compelling need to do so because others in her group communicated for her.

List serv and bulletin board. Two options for electronic communication that were not used to any extent by the participants include the list serv and the electronic bulletin board. These options were provided rather early in the project when most of the participants were getting their computers installed and just learning about their responsibilities to the project and about their computers. A number of the participants had never used a computer before, so they did not understand how or why to use a list serv or bulletin board. Sproull and Kiesler (1992) suggested that there is less audience awareness when communicating electronically because the audience is not immediately present or may be unknown to the communicator. However, in this project the participants were quite aware of the audience. A member of the university computer staff indicated,

The electronic bulletin board was not particularly successful, and that equates well to my experience with other projects. If you have a mix of users, some experienced and people with less experience like in this project, some people are really timid to use a new technology, and when you use a bulletin board system that is right out there in front of everyone else, what you are writing is right there. If you make a dumb mistake, everyone can see it.

Web-site. The project staff used electronic communication to support the teachers in various ways. A web-site was created to provide a place to visit for resources. This web-site included an annotated bibliography of philanthropy resources, speeches by philanthropic leaders, a list of approximately 300 related web-sites, information on the project, a student service curriculum developed in New York State, and the bulletin board. Eventually, the developed lessons will reside on the web site.

Summary. Themes emerging from the data–journals written over a two-year period, a written baseline survey, archival documents that self-report information about the participating teachers, interviews with staff and consultants, a sample of e-mail exchanges, and focus groups with teachers–indicate that teachers used CMC for five purposes: editing, emotional support, requesting information, sharing lessons, and research. The primary vehicle used was e-mail.

Two other options, list serv and the bulletin board, were not as enthusiastically endorsed. Literature on change and innovation (Havelock, 1973) would suggest that virtually all of the teachers navigated through the six steps of the adoption process: awareness, interest, evaluation, trial, adoption, and integration relative to the e-mail function. The help desk consultants suggested that the list serv and bulletin board functions were less successful in their integration.

The experience of the consultants was that the public nature of the "trial" stage for the list serv and bulletin board impeded the adoption process. "In the trial stage the individual uses the innovation to a small scale in order to find out how it will work in his own situation" (Havelock, 1973, p. 114). The large-scale, public nature of these two functions, compared to e-mail which can be either public (as with messages to multiple recipients) or private, may be the reason these two CMC vehicles have not yet been widely adopted by the teachers.

Research Question 1c

What impacts the frequency of communicating electronically?

The third component of the first research question seeks to identify what impacts the frequency of communicating electronically. Archival data, written surveys, teacher journals, personal interviews, and focus groups provided insights into this question. Six factors emerged. They are depicted in Figure 4.2. Time, skill, access, feedback, and mechanical/technical issues, as well as whether there was a purpose for communicating, are the factors that had the greatest impact on how frequently teachers communicated electronically.

Time. Time-related factors included competing demands such as family, teaching responsibilities, and amount of reading required by the project. It is not surprising that time was mentioned repeatedly as the factor most affecting frequency of use, as Martin stated in a focus group: "Time with a capital T!" The project teachers, all of whom worked full time, had to acquire knowledge in a new content area and learn new computer skills. The effect of time was also stressed in journal entries. One teacher noted in her

journal, "I have learned a great deal about managing e-mail. I realize I still have much to learn; however, time [sic] is the question." One of the teachers who was given release time commented that the element of time had been crucial because it allowed for the luxury of being able to use e-mail and to be able to experiment with new information. Time was cited by Weir (1992) as an important factor for participation in the Star School Project, indicating that some teachers had dropped out of the project due to lack of time. In addition, Coulter and Feldman (1995) identified that the competing demands for a teacher's time impeded curriculum implementation in a networked project. Eurich-Fulcer and Schofield (1995) also pointed to time as a factor that affects network usage in schools.

Time   Skill   Access

Frequency

Purpose   Feedback   Mechanical/Technical
                              Factors
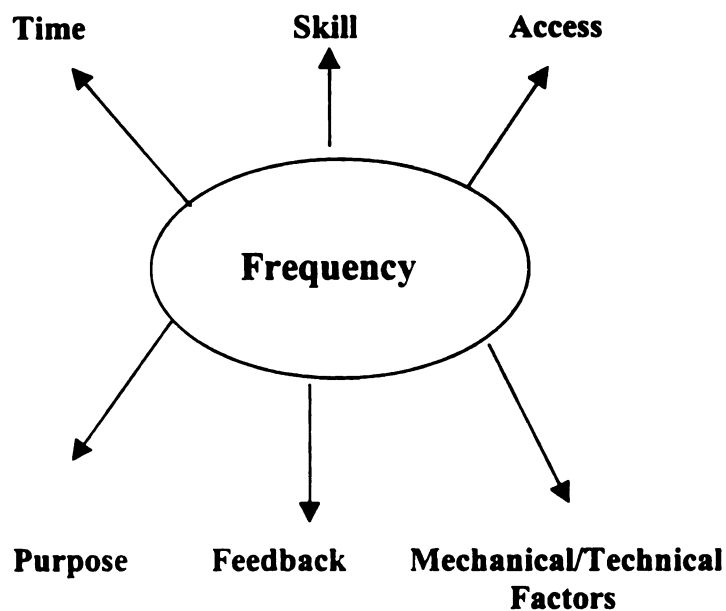
Figure 4.2:   Factors that impact the frequency of CMC.

The project plan called for teachers to receive release time during the first semester to write lessons. Because of organizational difficulties, most significantly the lack of

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substitute teachers, this release time was not available to all the teachers. In addition, the release time available was not consistent across the project. Although this feature of the project was not a focus of the present study, a couple of observations can be made based on teachers' remarks during the focus groups. The teachers who received the release time appreciated it but thought it would have been more useful during the second semester because they lacked adequate computer skills in the initial months of the project. Those teachers who did not have release time considered the lack of release time to be a definite disadvantage because they were so pressed for time to work on the curriculum.

Skill. Teachers also noted that their levels of competence with computers affected the frequency of using CMC. The lack of computer know-how not only had an impact on the frequency of computer use, it also caused great frustration among the new users. Frustration with technology boiled over in round one of the journals, with one of the teachers writing,

> Frustration and actual tears accompanied this entire torturous nightmare. It was not until about November that we [writer and teammate] actually became somewhat proficient in the use of them [computers]. Now, however, I wonder how I ever would get along without my computer, the Internet, and e-mail! My improved computer skills have great side benefits for my regular teaching and personal life!

Within the focus groups, the teachers discussed how their lack of skill in the beginning of the project impeded their progress and reduced their use of CMC. In one of the focus groups, a high school teacher stated that he did not use e-mail at first because he "didn't want to look stupid." Castle et al. (1990) found that computer skill and training are factors most associated with network use.

Access. Technical and access issues took their toll. Even though all project teachers eventually received a computer, during the first months of the project not all teachers had their computers. The project required that teachers who selected desktop computers keep those computers in their classrooms the first semester. This limited evening and weekend access. In the 1998 Baseline Survey, Silver noted, "Some teachers had not made extensive use of e-mail to keep in contact with their teammates or the project leaders. A major reason for this may be that the computers themselves were not available from the very beginning of the project" (p. 17). Eurich-Fulcer and Schofield (1995) noted that access and availability of computers have an obvious impact on use—those with access use the computer more than those without access. Coulter and Feldman (1995) also indicated that lack of computer access can impede implementation of a project.

The project support staff members were surprised at how little access teachers had to computers before their involvement in the project. Most of the teachers had limited access to computers before the project began. This situation affected the frequency with which the teachers used CMC during the first six to eight months of the project. During an individual interview, one of the computer support staff members commented that she considered this an "opportunity cost" because the lack of opportunity to use computers before the project had a negative impact on initial computer use.

Teachers eventually had regular access to computers. In the focus groups, when asked what helped them use electronic communication for curriculum development, they responded that access to a computer had a positive effect. Eventually, the teachers began to depend on CMC for important project information. During a focus group, an

elementary teacher commented, "If I couldn't access the computer for information, I felt out of the loop!"

Purpose. Teachers noted that they used CMC consistently if there was a compelling purpose for doing so. For example, when the assessment consultant expected that the assessment team members exchange drafts of assessment tools, they did. The importance of building in reasons for project participants to communicate electronically as a means of increasing CMC was noted by Coulter and Feldman (1995).

Early in the project, the curriculum specialist required that lessons be sent as attachments to e-mail. Because of this requirement, the teachers began sending lessons electronically. Jennifer recounted, "That's how I learned e-mail. We had to send him attachments and e-mail." During the focus groups, the teachers mentioned that they contacted project staff and each other for other purposes, such as requests for time schedules, lesson information, and even recipes. The project director stated in an individual interview that requiring the teachers to furnish information electronically provided an important incentive to learn to use electronic communication and a purpose for using it.

Feedback. Another factor that influenced the frequency of electronic communication involved feedback to a person's messages. During a focus group, Gloria stated, "At first I sent many e-mail messages, but then I stopped because no one was responding to them." Gloria entered the project as a competent computer user with skills beyond those of other project participants. During the focus groups the teachers commented on the importance of feedback from project staff, particularly the curriculum specialist. They awaited his response to their lessons and felt encouraged when he

responded. When one of the elementary teachers commented in a focus group, "His [curriculum specialist] enthusiasm assisted my lack of knowledge," the other group members nodded their heads, making affirming comments. In the baseline survey, Silver (1998) remarked on the importance of feedback, suggesting that timely feedback is important to reinforcing the teachers' motivation level.

Mechanical/technical factors. Mechanical/technical factors exerted an impact on the frequency with which teachers used CMC. Difficulties arose within some of the schools due to lack of sufficient technical support. In one of the school systems, the equipment had to be bolted down to ensure it would not be stolen. A significant and unexpected access issue involved local district fire walls installed to protect students from disturbing material available on the Internet. The fire walls, installed as a student safety procedure, interfered with connections to the project and the Internet in general. The problem of the fire walls was noted in several of the individual interviews, as well as during the focus groups and in the journals. Problems caused by technical and mechanical issues reduced the frequency with which teachers used CMC because these problems reduced computer access.

The initial tasks of installation and set-up and getting on line varied in relation to technical support available. Information offered during the focus groups and individual interviews, as well as the first journal round, points to the frustrations of those without adequate technical support. Wilson (1998), in his report *Journals, Round 1*, commented that "those [teachers] with technical support from schools, colleagues, or family made quick progress. Others who did not have access to this support found the process very frustrating" (p. 3). The literature on networked curriculum projects underscores the

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difficulties encountered because of the lack of adequate technical support, and the impact

that this circumstance has on both CMC and the project itself (Coulter & Feldman, 1995;

Eurich-Fulcer & Schofield, 1995; Riel, 1990b; Weir, 1992).

Summary. In determining what impacts the frequency of CMC, six factors

emerged from the analysis of the written surveys, journals, interviews, archival

information, and focus groups. These six factors—time, skill, access, purpose, feedback,

and mechanical/ technical issues—all played a role in affecting the frequency of the use of

CMC.

Research Question 1d

What components of computer training impacted participant use of CMC?

The fourth component of the first research question explores the extent to which

computer training had an impact on the use of CMC. As depicted in Figure 4.3, both

formal and informal training opportunities existed for the project teachers.
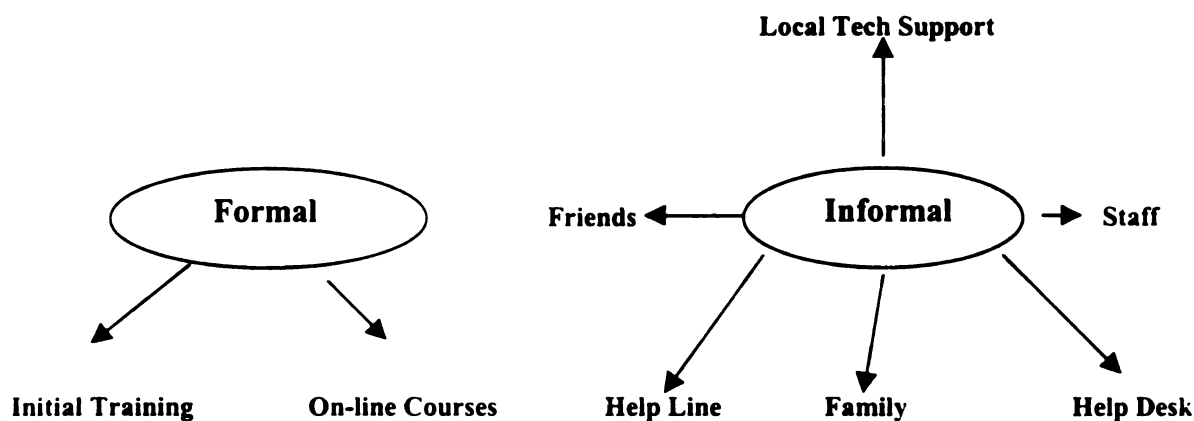
Figure 4.3: Training components.

Training components. During the fall of 1997, two months into the beginning of the project, the teachers were offered eight hours of computer training in a lab setting. When the project computers were given to the teachers, the software and hardware needed for the project had already been installed. Common hardware and software allowed for common training and also sharing of information between the teachers, teachers and staff, and teachers and the help desk. In addition, the teachers had a dedicated help-desk person familiar with the project whom they could call, e-mail, or fax at any time during business hours.

On-line computer courses were made available to the teachers free of charge through the university. These included introductory classes through the highest level training in Microsoft Word, Excel, Powerpoint, Access, and web-page development. The courses were self-paced, could be taken whenever the teacher was available, and were self-scoring. In addition, each teacher was provided a mini-grant of $500 in year one, $250 in year two, and $250 in year three to use toward the project. Staff suggested to the teachers that these mini-grants were appropriate for supporting computer training through a local vendor, an intermediate school district, or a community college program.

Hands-on training: There is no uniform opinion regarding the effectiveness of the initial training. Factors outside the control of the trainers had an impact: Not all of the teachers had computers at the time of the training; the training was offered at the beginning of the school year, a busy time for teachers; and the skill levels of the teachers ranged from competent to no previous experience with computers.

Many of the teachers expressed feelings of frustration regarding learning to use the computers. Anderson stated, "[We had] a barrage of information without practice time

. . . [but] it did give me some courage to try some things." Rene concluded, "I thought it [computer training] was inadequate. . . . There were different levels of ability, with some people playing solitaire."

On-line training: As of the summer of 1999, 10 teachers had signed up for the on-line computer courses. Three teachers signed up for two classes each. Lack of time once again emerged as the primary reason that more of the teachers did not take advantage of these free classes. Teachers did say that they planned to take an on-line class during the summer when they had more time, but only five did this. Two other reasons offered for not registering for a class involved lack of confidence and not wanting to show incompetence. One teacher revealed that she did not believe she would be able to figure out how to take a class on-line.

Family and friends: In every focus group, teachers indicated that the assistance of their spouse or children was what really helped them: "I never would have survived the training—my husband and children bailed me out!" Friends at home and at school also provided valuable assistance. As related by one teacher in a focus group, "I would ask a friend who knows a lot about computers to help me when I was in trouble." Others mentioned the importance of the help offered by friends. In *Journal Round 3*, a teacher wrote, "The support I have used most is from my peers." The technical support of friends and family was seen as such a benefit to learning to use the computer that one of the urban teachers indicated during a focus group that she felt at a disadvantage because she was a single person with no family to assist her.

Help desk and help line: Technical support was provided to the teachers in addition to the computer training through a help desk at Michigan State University, and

with a 1-800 number available 24 hours a day. Further assistance was available through the Dell Computer help line. In *Journal Round 3*, a teacher noted that the sources of computer support that she used included "support from friends, co-workers, and Dell." Another teacher noted that Dell provided "wonderful support." Not all the teachers took advantage of the assistance available through the help desk. During a focus group, when asked why, teacher responses varied from "I didn't know about it" to "I did not know what questions to ask." One journal entry noted, "I underutilized MSU support. I know now but did not reach out for it." For those who had the confidence to use the help desk, it was seen as an extremely valuable resource. As described in a teacher journal, "Sue Goodrich [of the help desk] was helpful in finally solving my problems." Another teacher explained, "Sue Goodrich and her staff were wonderful! I couldn't say enough nice things about how willing she was to help." However, other teachers did not find it so useful, as noted in this journal entry: "The first couple of months were extremely frustrating as I attempted to become computer literate. I did not find MSU particularly helpful."

Staff coaching: Besides the computer training, technical assistance was provided by project staff. At monthly teacher meetings, the curriculum specialist spent time with teachers who were having trouble with the computers. The secretary visited three of the teachers on-site to work with them on issues such as saving Word documents and removing the shipping cardboard from the printer. During the focus groups, the teachers mentioned that the project secretary was very helpful and even made site visits to assist some of the teachers in need. This was especially appreciated because she sat down at the computer with the teacher being helped. Project staff played an important role in the informal computer training. The curriculum specialist, in particular, walked teachers

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through computer operations. During the focus groups, the teachers remarked that his help was specific to their need and offered them encouragement. A notation in one of the teacher's journals revealed, "Judy had helped me. Terry explained how to do attachments and required we do our lessons on Word and in a prescribed manner and sent via e-mail."

Local tech support: Although the level of tech support within the schools of the project teachers varied, those with an accessible technology support staff member remarked that this support was valuable. One teacher wrote in her journal, "School has a computer support person in each bldg. Since the bulk of my day is spent at school, they are my resources." The large city school and the smaller rural districts had limited or no access to a computer support person on staff. During the focus group interviews and through the individual staff interviews, both the teachers and project staff stated that district support staff provided helpful assistance to the teachers. However, at the time that the teachers were first learning to use the computers and new programs, it was the beginning of the school year, an exceptionally busy time for tech staff. Therefore, the tech support was not always available even to those with technology technicians on staff.

Frustrations with the training and with technology. Frustration with technology jumped out as a dominant theme of the first round of journal entries written during the spring of 1998. Learning to use computers effectively presented a significant challenge to a majority of the teachers. The journal entries identified problems getting on line, inadequate set-up of some computers, and a general feeling of frustration and inadequacy. The overall problems associated with getting all members up to speed may have contributed to the teachers' perceptions regarding the computer training. During a focus group, Elaine attested that the computer training completely revolutionized her teaching:

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"I hit the wall! I now know how it feels to be dense or slow!" Mary Jane added, "It [computer training] had zero impact." When asked what could have made the training more useful, the typical response was to have a person come to their location and sit with them while providing individual training.

From another perspective, the project curriculum specialist maintained, "For many teachers the technical training has had a tremendous impact." He provided evidence of this by stating that he was receiving far fewer calls for assistance than at the beginning of the project, as was the computer support team from Michigan State University. In addition, he indicated that the teachers now displayed more confidence using computers –for example, talking about zip files and various web sites they visited. The project secretary contended that the training "helped tremendously–for those with some experience. However, for those without prior computer experience, the training was premature." She further stated, "Without the training the process would have been slowed and lessons would have been handwritten. . . . The training got everyone at least used to using the computers." The project director thought that, without the technical training and assistance, some of the project teachers would not have been able to use the technology available to them.

Lessons learned. In considering lessons learned from the training experience, the project director indicated that next time she would offer a whole schedule of training options for small groups. Also, she would identify a person within each teacher's school system with technical expertise whom the teacher could ask for assistance. The project director offered this insight: "The problem is . . . you can go to a training course and it's

like eating Chinese food. You're full when you walk out and by the time you get to your desk you are hungry again."

Summary. The computer training for the project was realized through both formal and informal channels. The formal training included eight hours of hands-on instruction in a lab setting. The teachers were also offered on-line computer classes through the university, although only about one quarter of the teachers had signed up. Informal avenues for training included assistance from family, friends, staff, the help desk and help line, and local tech support.

Research Question 1e

How has the K-12 Education in Philanthropy Project encouraged participants to employ CMC in their efforts to produce a curriculum on the teaching of philanthropy and civic responsibility?

The final component of the first research question considers how the K-12 Education in Philanthropy Project encouraged participants to use CMC as they developed the curriculum. Archival data, written surveys, teacher journals, personal interviews, and focus group interviews served as data sources that assisted in answering the question. Sources of support provided by the project were realized through project leadership, curriculum support, and incentives. A brief discussion is offered first to further provide a context regarding the K-12 Education in Philanthropy Project.

Context. The K-12 Education in Philanthropy Project proposal was developed over a two-year planning period. Advisors for the planning included classroom teachers, service learning coordinators, school and intermediate school district administrators, and representatives from the Michigan Department of Education's (MDE) curriculum division.

The advisors based their discussions on their experiences in education, and on a year-long national study on the status of philanthropy education in the United States.

The advisory committee of seasoned educators worked in cooperation with a larger steering committee of foundation, nonprofit, and related representatives to design the program supports. These representatives included, for example, the National Board for Professional Teaching Standards, the Michigan Community Service Commission, the Michigan Nonprofit Association, the Council of Michigan Foundations, the Urban Education Alliance, and graduate schools at Grand Valley State University, Wayne State University, and Michigan State University. Altogether, 38 individuals representing major educational and nonprofit systems were involved in multiple reviews of the project design.

In obtaining the initial project support from the W. K. Kellogg Foundation of $1.5 million, the project leaders submitted detailed answers to questions regarding the use of technology and technical support. The original plan, designed by classroom educators, utilized computer technologies to overcome the twin issues of geographic distance and isolation that it was anticipated the teachers would feel. In addition, the plans called for teachers to begin using computer technology (web research and self-study) in the teaching of the lessons themselves.

Upon funding by the W. K. Kellogg Foundation, project leaders approached Michigan State University's Office of Computers, Libraries and Technology to seek their assistance in establishing the network for the project teachers. Through contractual agreements, MSU obtained the hardware, installed the software, and delivered the computer equipment to each teacher. A help desk was established specifically for the teachers. Individual Internet-access accounts were established through the university that

provided for the typical Internet services, and in addition provided access to the full library

resources of the university and specialized computer services such as a project list serv

and a bulletin board for discussion on the web site.

Project leadership. Project leadership has played an important role in supporting

the use of CMC by participants. The leadership has supported the use of CMC in five

ways. These are depicted in Figure 4.4.

Role of Project Leadership

→ **Provided computers and software**

→ **Provided technical training and support**

→ **Modeled the use of Technology**

→ **Set forth a vision that included technology use**

→ **Provided intelligent, inspirational leadership**
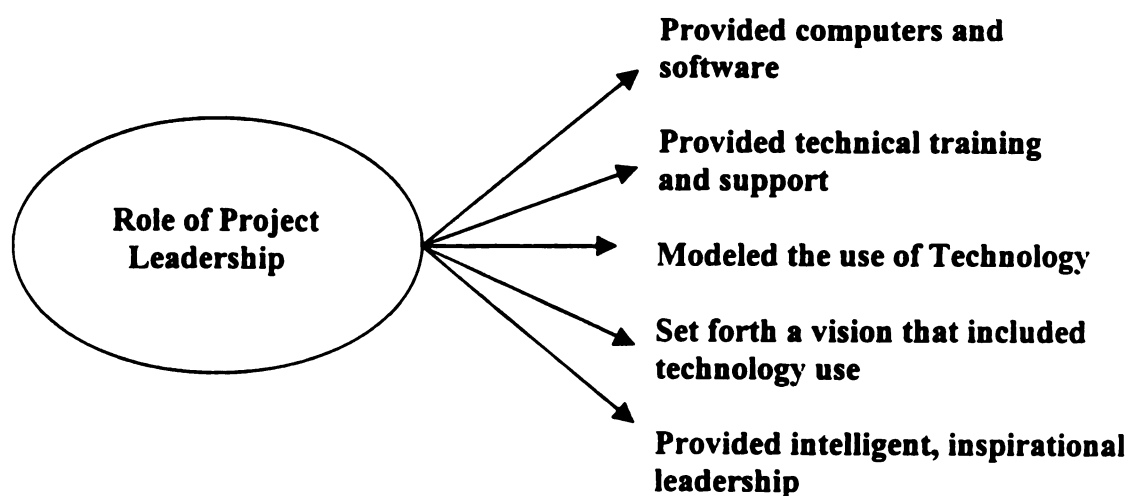
Figure 4.4: Support for employing CMC as a tool in curriculum development.

First, all participants were provided with a computer, either through funds from

the project budget or through their local community foundation. Along with this, the

computer equipment was uniform, with identical software programs loaded before arrival

in schools. During a focus group, one participant commented that the commitment to

technology use was clear to her because each teacher was given a computer. The teachers

were provided "pilot accounts" through Michigan State University for Internet use. These

accounts allowed the teachers to have access to university resources that are available to

faculty. The teachers were also connected to the Indiana University Center for Philanthropy. Further, the staff maintained regular contact with the teachers through e-mail for curriculum development assistance and to offer emotional support. A secondary teacher stressed, "The project forced us to use it [CMC] to share lesson plans."

Second, project leadership made a significant commitment to technical training and support. And although the training was not necessarily valued by all project teachers, the fact that it was offered showed a commitment to the use of technology for communication.

Third, the project leadership modeled the use of technology and expected the teachers to use it. Without that expectation, it is likely that a number of the participants would not have communicated electronically. Further, support for CMC was provided through the project web site.

Fourth, the project steering committee and Council of Michigan Foundations provided a clear vision that included and supported the use of technology for communication. Indeed, the original grant proposal stressed the importance CMC would play in a state project involving geographically dispersed teachers.

Fifth, the project director is a bright and inspirational leader who encouraged teachers to use technology for communication. Riel and Levin (1990) underscored the crucial role that a project leader or facilitator serves in a networked project.

Curriculum support. Curriculum support is also a leadership issue. A curriculum specialist was hired to oversee the development of the K-12 lessons and units. As indicated earlier in this chapter, he played a key role in encouraging and requiring the teachers to use technology. Had he not required that the lessons and units be attached to

e-mail sent to him, teachers would have continued to send and expect hard copy. Those supporting the curriculum the most–the curriculum specialist, project director, assessment consultant, and project secretary–all modeled the use of technology and expected the teachers to communicate through CMC. Teachers commented on how important the encouragement of staff was to their confidence in using the computer. Donna shared that the curriculum specialist once said to her, "'Just touch it. See how it feels.' Then he coached me through it." Karen stated matter-of-factly, "Teachers were encouraged [by the staff] to use the computers for developing lessons."

An important source of curriculum support was provided through the assessment consultant because assessment is an integral part of curriculum development (Glatthorn, 1987; Jacobs, 1989; Resnick & Klopfer, 1989). During the focus groups, the teachers identified the work in the assessment subgroups as important to their development of the lessons. The assessment specialist required that teachers work together in the design of student assessment materials and reinforced that those assessments had to be tied to the curriculum. During a focus group, one of the elementary teachers stated, "The assessment group is what really helped me learn how to work together [using CMC] on the lessons."

The social studies consultant for the Michigan Department of Education also provided curriculum support to the project director, curriculum specialist, and teachers. Her role included helping the project teachers tie the lessons to the state standards and benchmarks, a content issue. Although her curriculum support was important for content purposes, no teacher or staff member directly mentioned that her support had an impact on the use of CMC for curriculum development. She did inform project members of

various web sites that provided information useful to lesson development, and her

materials and ideas were incorporated into the lessons that were developed.

Incentives. Certainly the incentive of a state-of-the-art computer contributed to

the use of CMC by the project participants. Because the large majority of teachers in the

project did not have access to a computer before the project, it is unlikely that they would

have engaged in CMC without having a computer provided. Access to a computer, or

lack of access, has been shown to be one of the important factors that can facilitate or

impede CMC in a networked project (Coulter & Feldman, 1995; Eurich-Fulcer &

Schofield, 1995).

During a focus group, one of the elementary teachers stated, "This [getting a

computer] is the reason I signed up for the project." However, other teachers who

reacted to questions about the incentive value of a computer had become very committed

to the ideals of the project, stating that being a part of such an important project was now

their biggest incentive. As Silver (1998) stated in the Baseline Survey,

> For most of the teachers, then, the most common motivation for involvement
> appears to have been the Project's own normative goal–developing a curriculum in
> philanthropy. The teachers on the whole have made an enormous intellectual and
> time commitment beyond any immediate compensation they might expect to
> receive.

Indeed, Silver's survey revealed that all but two of the teachers considered the objective

(of making education in philanthropy a standard part of the school curriculum) to be either

"very important" or "vitally important." Further evidence of the commitment to the

project can be found in the teacher journals. As Wilson (1998) noted in the *Report on*

Journals, Round 1, "Without exception, the teachers expressed enthusiasm for their work

and the mission of the project." This does not directly relate to how incentives affect

CMC, but rather it goes more to the point of participation as a result of strong commitment to a belief system. The computer may have been a hook to bring a few teachers into the project, but once involved, personal commitment became the powerful incentive. With involvement came CMC. So, even though receiving a computer may not have been the incentive that drew a majority of teachers to the project, having immediate access to one certainly had a positive impact on CMC. In the 1999 evaluation of the K-12 Education in Philanthropy Project, Lesco and Flinders stated, "Teachers unanimously proclaimed the computers to be a boon to their philanthropy curriculum work and to their sense of professionalism" (p. 101).

The feelings of satisfaction and accomplishment that embrace a person when a difficult challenge is met may have served as an incentive for using CMC. Although no teacher specifically stated this, the pride they held in their accomplishments was apparent during the focus groups in the manner in which they discussed what they were now able to do with a computer, compared to how unskilled they had been at the onset of the project. Their enthusiasm was evidenced through animated facial features, increased volume and speed of speech, and word selection. In each focus group a teacher mentioned feeling proud of being associated with a project that is important to our society and the lives of children. When such a statement was offered, some nodded their heads and others affirmed the statement. The curriculum specialist attested, "The real incentive [for participation] is that they feel a sense of accomplishment. They are on the cutting edge of doing something new, challenging [pause] something they believe in. A chance for them to contribute to their profession, *to be part of a project that holds promise" (emphasis added to impart the depth of feeling he displayed when making the statement)*. In

Journal Round 3, one of the teachers wrote, "I brag about teachers all over the world being able to download our lessons when they're done. Free of charge, no hidden agenda, promoting only the giving, sharing and volunteering individuals can do to make a difference in their community. There is no other organization which offers a curriculum in this way." Anderson's (1995) work points to the important role that such positive teacher attitudes can play in curriculum reform efforts.

Summary. The K-12 Education in Philanthropy Project has had an impact on the use of CMC by the project participants in a number of ways. Importantly, the teachers were provided a computer for their lesson development and for CMC, as well as computer training and support. Without this incentive, most of the teachers would have had either no access to computers or limited access. The project staff set forth the expectation that the teachers would use the computers for lesson development and for communication, and provided encouragement along the way. Further, the project director provided the mission for the work and a road map for the journey. In addition, the curriculum specialist and assessment consultant offered support for the development of lessons and assessments, and required that lessons be shared electronically. Finally, the project leadership was able to build in a commitment to developing a curriculum in the teaching of philanthropy. The organizational support factors of project leadership, curriculum support, and incentives had a positive impact on the use of CMC for the development of the K-12 Philanthropy Curriculum.

Summary of Findings for Research Question 1

CMC has had an impact on individual practice when developing curriculum in a networked project in a number of ways. In the K-12 Education in Philanthropy Project, CMC has offered a method of communication that differs from traditional modes of communication. The asynchronous nature of CMC has overcome issues associated with distance and time. Although CMC offers the capability of forwarding exact messages and clarification of writing, it is also open to misinterpretation because visual and auditory cues are lacking. In this regard, CMC can present itself as a double-edged sword.

CMC made it possible for staff and teachers to share information, reducing the need for paper copy. The staff indicated that, even though they added meetings to provide more face-to-face interaction, the total number of meetings needed for developing the curriculum was reduced because of the opportunity to communicate electronically. Telephone conversations decreased as the teachers became familiar with the use of e-mail. An interesting feature of the use of CMC is the reciprocal relationship it has with face-to-face communication in that one enhances the other.

The teachers used CMC for a variety of purposes, including editing their original lesson plans, requesting information from each other and from staff, sharing their lessons, providing emotional support, and doing the research required to develop accurate and interesting lessons. The teachers were most likely to communicate by e-mail with the curriculum specialist. They also used CMC to communicate with the rest of the staff more readily than with each other. The list serv and bulletin board options were not used to any extent by the teachers. These options were offered quite early in the project, and the teachers showed little interest in using them for communication.

This research shows that a number of factors had an impact on the frequency of using CMC. The participants repeatedly expressed the inhibiting effect that lack of time had on various aspects of this curriculum development project, including the frequency of using CMC. In addition, participant skill, access to computers, and mechanical/technical issues had an impact. As the participants became more skilled, they were able to use CMC for a variety of purposes. With access to a computer, CMC occurred. Limited or no access due to a variety of reasons reduced electronic communications. Further factors that influenced the frequency of CMC involved whether or not the sender received feedback and whether there existed a purpose for communicating.

Training in the use of computers exerted an impact on the individual use of computers for communication. Teachers learned to use their computers from formal training and through informal means. Formal training consisted of eight hours of initial training in a lab setting and the opportunity to enroll in a variety of on-line courses. Although frustrating to the teachers, the computer training assisted them in learning to use their computers for the purposes of the project. The informal training consisted of help from family, friends, peers, staff, local technology support, and a help desk. The teachers found the informal training very helpful, citing the opportunity to receive individual assistance as the reason.

The project itself offered a structure that had an impact on the individual use of CMC in three ways. First, the project leadership played an important role in supporting participants' use of CMC for curriculum development. The project leadership contributed computer equipment, training, support, encouragement, and a vision for the project. A second feature of the project structure that supported the use of CMC came in the form of

curriculum support. A curriculum specialist hired for the project provided curriculum

oversight and assistance. Both the curriculum specialist and the assessment consultant

required that lessons and assessments be shared electronically. The final feature of the

project structure that supported the use of CMC included the incentives associated with

project participation. These incentives involved not only being provided a state-of-the-art

computer, but also feelings of commitment to a project of importance. These feelings of

commitment may have served as an incentive for using CMC.

Results From Research Question 2

What is the impact of CMC on the process of curriculum development and the individual?

CMC brings an interesting dimension to curriculum development, offering the

potential of facilitating the process. Because traditional curriculum development occurs in

face-to-face meetings, the addition of CMC exposes people to another way of doing

business. This section explores the impact that CMC had on curriculum development in

this networked project. Data analyzed were derived from focus group interviews, archival

data, samples of e-mail, and individual interviews.

Research Question 2a

How does CMC inhibit and enhance curriculum development?

The first component of Research Question 2 considers how the use of CMC

inhibits and enhances curriculum development.

Inhibiting aspects of CMC. This research suggests that CMC can have an inhibiting effect on curriculum development. These inhibiting factors are detailed in Table 4.4 and are discussed here.

Lack of experience and competence with computer technology: Participants who lacked experience and competence with computer technology were initially unable to perform the tasks required to communicate or to prepare lesson plans electronically. During individual interviews, both the project director and the curriculum specialist explained that, as a whole, the participating teachers on entering the project had far less technical ability and experience than the project leadership had expected and planned for. Because of this, the number of scheduled face-to-face meetings had to be increased for the purpose of sharing information, encouraging the teachers, answering questions about technology, and as one person offered, "hand-holding." The project director noted that this lack of computer know-how resulted in a delay in lesson development. One of the teachers revealed in a focus group, "I did not realize the entire project was to be through electronic communication. We were not all knowledgeable and this hampered us at first, so we used the telephone and fax."

Table 4.4: The impact of CMC on curriculum development in a networked project: Inhibiting factors.

Inhibiting Factors	
Lack of experience and competence with computer technology	Time issues
Unreliability of computer support systems	Inability to brainstorm
Inadequate technical support and technical difficulties	General characteristics of electronic communication

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During an individual interview, the assessment consultant offered another problem

associated with the lack of computer savvy: "Because most of the teachers were not

skilled computer users, they frequently missent messages by e-mail or included large

amounts of information by repeatedly forwarding messages. The recipient then had to

wade through the entire string of messages to locate the actual intended message." The

literature on curriculum development in a networked project indicates that lack of

adequate technical training can have a negative effect on such projects (Coulter &

Feldman, 1995; Eurich-Fulcer & Schofield, 1995). In the case of the K-12 Education in

Philanthropy Project, the majority of teachers entered the project without previous

experience with computers.

Unreliability of computer support systems: Another inhibiting feature that the

reliance on CMC had on curriculum development was the occasional unreliability of

computers and support systems. For example, if a server went down for a period of time,

CMC could not occur. This was important when deadlines had to be met or information

had to be shared before a teacher meeting. A teacher from one of the rural districts

indicated in a focus group that it was difficult to get on-line with her Internet provider.

Weir (1992) stressed the importance of an efficient computer system to a networked

project, in terms of both reliability and availability.

Inadequate technical support and technical difficulties: Other technological

difficulties such as availability of phone lines, fire walls, and inadequate technical support

on site inhibited the progress of curriculum development. Coulter and Feldman (1995)

identified inadequate technical support as a factor that impedes curriculum implementation

in a networked project. At one point in the project, participants contracted the Melissa virus, which affected progress and comfort levels.

One of the teachers from a large urban district noted technical difficulties in her journal:

> Though the computers could finally be plugged in they were to all extent nonfunctioning. We could not reach the Detroit School's home page. We could not get on the net, we could not reach MSU. . . . A man was sent out and worked many hours. He finally identified the problem, a fire wall. . . . The fire wall prevented us from connecting with MSU, from the net, from the other teachers.

In another journal entry, the same teacher indicated that she had to wait a number of weeks for a technician to come out to assist. She noted that her equipment was "far superior to any that our school's technician had seen." Another teacher wrote that she "felt so isolated and there was no one to assist me at my location." Even in the face of technical and application difficulties, the project director indicated that the teachers were hesitant to ask computer-savvy students for assistance. She speculated that it was hard for some teachers to give up the notion that they needed to know more than their students. This perspective was not echoed by the teachers.

Time issues: From the teacher perspective, an inhibiting feature of CMC on curriculum development was the amount of time it took to learn to use the computers with enough competence to fulfill the requirements of the project. Issues regarding time abound in the literature on the use of CMC in a networked project (Coulter & Feldman, 1995; Drayton, 1993; Eurich-Fulcer & Schofield, 1995; Weir, 1992). Round One Journal entries detailed the extreme frustration that the teachers felt regarding learning to use the computers and the technical difficulties presented, as well as the amount of time required. The learning curve was steep and ate up time that could have been spent writing lessons.

Other problems stemming from lack of time were discussed earlier in this chapter in regard to those factors that impact frequency of using CMC.

Inability to brainstorm in a group: During the focus groups, the teachers also mentioned what was lacking when communicating electronically for curriculum development. Brainstorming, a technique teachers frequently use as a means to generate ideas, could not occur. One teacher stated, "Brainstorming is important for curriculum work. You can't do it when you communicate electronically." That chance to bounce ideas off each other that is an option in group work was also mentioned as an inhibiting factor of CMC because it was difficult to achieve when communicating electronically.

Communicating without affect: A final characteristic of CMC that could have an inhibiting effect on curriculum development involves communication without affect. The teachers stressed that they missed the personal feedback available through voice, body language, and humor that is a part of face-to-face meetings. One of the teachers stated, "There is no personal feedback [with CMC], no body language, no voice. I could not create curriculum without face-to-face communication." In fact, the importance of the face-to-face meetings was a strong sentiment held by teachers and staff. Both groups stressed that face-to-face meetings are essential to a project of this nature. As stated by a member of the computer support staff during an individual interview, "Electronic communication does not allow you to turn a program loose—you still need face-to-face communication." Sproull and Kiesler (1992) also contended that CMC is not a substitute for face-to-face communication.

Misunderstandings that can occur through CMC have the potential to inhibit the curriculum development process. The teachers did not stress this, yet the project director,

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curriculum specialist, computer support staff, and assessment specialist all mentioned that misunderstandings had occurred through CMC. The curriculum specialist pointed out how careful he was with his words when providing feedback on a teacher's lesson so that there was no misunderstanding. He stated, "It is easy to be short [when using CMC] which can sound terse." A misunderstanding occurred, for example, when the curriculum specialist asked a teacher about a lesson. The teacher thought that he was accusing her of copying someone's work when, in fact, he was just asking for clarification because he had received two identical lessons under different names. The project director suggested that misunderstandings can occur when project leadership and participants come out of different systems, as was the case for her and the teachers. She indicated that she was very sensitive to that issue when communicating electronically (and otherwise) with project teachers.

One of the teachers wrote in her journal of a difficulty she had encountered when first using e-mail. She had sent a sarcastic message to "everyone in power" in her district. She wrote, "I was new to the wonders of e-mail. . . . My e-mail message was not the problem, the tone of it was. I should have just stated the facts. I didn't realize so many people would be reading it." The literature on CMC underscores the potential for misunderstandings when using CMC because the social cues available through face-to-face communication are not present (Davis & Brewer, 1997; Sproull & Kiesler, 1992; Turkle, 1997).

Summary: This study revealed that the use of CMC had an inhibiting effect on curriculum development in a variety of ways. Unreliability of computer systems, inadequate technical support, and lack of computer skill all slowed the curriculum

development process. Social and personal communication factors such as inability to brainstorm through CMC and misunderstandings placed constraints on teachers as they developed lessons. In addition, the time required to become sufficiently adept with the computer to use it in developing lessons and for communication inhibited the use of CMC for developing the philanthropy curriculum.

Enhancing aspects of CMC. Table 4.5 displays those factors of using CMC that enhanced the development of curriculum in this project. Teachers and project staff agreed that CMC offers certain advantages when developing curriculum, as compared to traditional curriculum development methods. However, the project staff held far stronger positive opinions in this regard, perhaps due to the roles they had played within the project and because they were experienced computer users before the project began. When discussing how CMC enhanced curriculum development, the teachers repeatedly returned to the frustrations that they felt learning to use computers.

Table 4.5:   The impact of CMC on curriculum development in a networked project: Enhancing factors.

Enhancing Factors	
Reduces problems associated with geographic distance	Offers ability to correct on-line
Provides for asynchronous communication	Provides access to on-line resources
Allows for communication in real time	Contributes to information management

The teachers and staff members did agree that the important aspects of this form of communication that serve to enhance curriculum development include the capability of overcoming problems associated with geographic distance, its asynchronous nature, the

ability to communicate in real time, the option to make corrections to lessons on-line, and the access it provides to on-line resources. The organizational features available through electronic communication, such as managing information and maintaining a record of exchanges, were also cited as strengthening the curriculum development process.

Reduces problems associated with geographic distance: CMC made it possible for project teachers and staff, separated by geographic distance, to work together in the development of curriculum lessons and units. During an individual interview, the project director affirmed that this project could not have been undertaken without CMC. At the time of the study, the project director and the curriculum specialist, two key players in the project, worked in offices on opposite sides of Michigan; the assessment specialist resided in Ohio; and the computer support staff members were located at Michigan State University. Their primary avenue for communication was through e-mail. Also, as mentioned earlier, the 43 teachers were spread throughout Michigan, including the Upper Peninsula. During an individual interview, the assessment consultant maintained that he "couldn't have been a part of the project without it [CMC]." He went on to state, "I live in Cleveland, Terry works in Detroit, Kathy and Judy work in Muskegon. We swap documents regularly–especially when we get ready for a meeting." CMC certainly allowed the teachers to engage in frequent communication with the staff regarding the project. During a focus group interview, one of the teachers stated, "Electronic communication is indispensable to this project. I can just e-mail Terry in Detroit if I have a question."

Provides for asynchronous communication: Teachers appreciated the ability to send and retrieve information at their convenience because they had few opportunities

during the school day to make contacts with other project participants. Materials could be sent to a teacher who was in class, and that teacher could open the document after class or in the evening. During a focus group, one of the teachers remarked, "I can send e-mail to Terry and open up his response when I get home at night." Another teacher noted, "With e-mail I can attach a lesson and send it out late at night and get a response in the morning." The project director offered, "It [CMC] gets us beyond the fact that the teachers are in class. We can send information to them at any time. We don't have to try to catch them when they are out of class."

Allows for communication in real time: The immediacy of communication that is characteristic of CMC was also recognized as important to project teachers and staff. Michael commented, "I asked for information about a rubric and someone sent it immediately. . . . It's good to get out of my box and share electronically." In *Journal Round 2*, a teacher reflected, "[I feel] very positive [about computers and e-mail] now that I can see somewhat what the speed of the tool can enable me to do."

Project staff members talked about the difference between sending lessons through U.S. mail versus through e-mail, and the advantage of using e-mail. "It [CMC] makes things faster. You can shoot drafts back and forth and comment in the document." The project secretary affirmed that the speed of transmitting information enhanced the work of the project. She stated, "There is no delay when sending things electronically. It [CMC] has increased efficiencies. If we had to send information through snail mail, it would just take too long." The curriculum specialist agreed: "We can send things back and forth so quickly [with CMC]. If we had to do it without e-mail, it would take weeks!"

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Offers ability to correct on-line: A further way in which CMC enhances curriculum development is that it offers the ability to correct on-line. Not surprisingly, the curriculum specialist cited this as a distinct advantage. During an individual interview he stated, "We showed them how to correct on-line, and it has really saved time. I can send back suggestions in the document, and they can just make the adjustments." During a focus group, an elementary teacher extolled the advantages of being able to correct on-line: "He [curriculum specialist] showed us how to correct on-line. Now it is so easy to help each other with our lessons."

An advantage noted by a member of the computer support staff is that CMC allows those involved to comment within the context of the document itself. CMC has also allowed for a quick clarification of ideas. This has been particularly important with the lesson exchanges. Finished lessons will eventually be placed on the K-12 Education in Philanthropy web site for teachers to download for use in their classrooms.

Provides access to on-line resources: CMC made it possible for the project teachers and staff to access a wealth of on-line resources. The curriculum specialist remarked, "I have been able to tap into curriculum resources through CMC that would have been unavailable otherwise." He stated that he had visited web sites and obtained e-mail addresses of people previously out of his research or unknown to him. He shared, "I made contacts with people I never would have known about. I was able to tap resources and get an immediate response. Without CMC it would have taken weeks." The project director agreed: "Being linked to the Internet enables us to have access to all kinds of information. We have the ability to do extensive research through the Internet." In *Journal Round 3,* responding to the question "How do you feel about the K-12 project

using the WWW to deliver nonprofit content?" one respondent wrote, "The web is better than attending a lecture to me. . . . I can go right to the interest area. . . . I can move at my pace instead of others'." A high school teacher noted during a focus group, "I use info available on the Internet for lesson development. . . . I find it very useful." The teachers also mentioned that they e-mailed information about good web sites to colleagues or project partners.

Contributes to information management: CMC provided an important organizational medium for the project in a number of ways. E-mail provided a record of communication. Beth, an elementary teacher, commented, "In face-to-face conversations I can't reconstruct what has been said. With e-mail, I can read it six times if I need to." Another elementary teacher, Sarah, added, "The information is all in my computer. . . . I just carry it wherever I go. It's a management issue."

CMC served as an even greater management tool for the project director and curriculum specialist, who noted the practical applications. Records of communications existed from the inception of the project; orders, conference information, and materials were sent and maintained in files; and lessons sent and received were available with a key click. A significant feature mentioned by staff and teachers was the importance of the lesson template that was developed by the curriculum specialist. All lessons had to be written within the framework of the template to ensure uniformity of lessons. During a focus group, one of the teachers explained, "We had to put our lessons in this template. At first it seemed restrictive, but now I see the importance of having a common template."

Summary. An analysis of the data suggests that CMC has the capacity to both inhibit and enhance the development of curriculum in a networked project. Those factors

found to have an inhibiting effect include lack of experience and competence of those involved in the project, the unreliability of computer support systems, inadequate technical support for project participants, misunderstandings resulting from the use of CMC, inadequate time available for use, and the lack of ability to brainstorm using CMC.

CMC also enhanced the curriculum development process. It reduced the problems associated with geographic distance. Notably, both teachers and staff stated that the project would not have been possible without the opportunity to use CMC. Further, it allowed for asynchronous communication and increased the speed of information exchanges because it provides for communication in real time. CMC also offered the ability to correct on-line as well as to have access to innumerable resources through the Internet. Finally, CMC served as a tool for project management by providing a record of lessons, e-mail exchanges, and uniform lesson plans.

Research Question 2b

What factors assisted and what deterred teachers from using CMC when developing curriculum?

The second component of Research Question 2 looks at those factors that assisted and those factors that deterred teachers from using CMC when developing curriculum. The data sources examined to identify these factors include three focus group interviews with the project teachers, individual interviews with staff, and archival data, including teacher journals. Subquestion 2a looked at the impact of CMC on the general process of curriculum development. This section puts more focus on the impact of CMC on the individual user within the curriculum development process.

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Factors that assisted. The data revealed a number of factors that assisted teachers in using CMC when developing curriculum. These factors are depicted in Figure 4.5 and are discussed in this section.

Access to a computer: As noted in the previous section regarding factors that influenced frequency of use of CMC, having access to a computer was important. The teachers affirmed that having access to a computer throughout the project provided obvious and very important assistance for using CMC when developing curriculum because few would have had access to a computer without the project. In addition, Lois, an elementary teacher, noted that the assertion by project staff "that we would use the computer for curriculum development was very important." The literature supports the notion that having access to a computer is important when developing curriculum in a networked project (Riel, 1990a; Weir, 1992).

Access to a Computer   Required Exchanges

Training◄────── | Factors That Assisted Teachers | ──────►Technical Support

Experience with Computers   Emotional Support
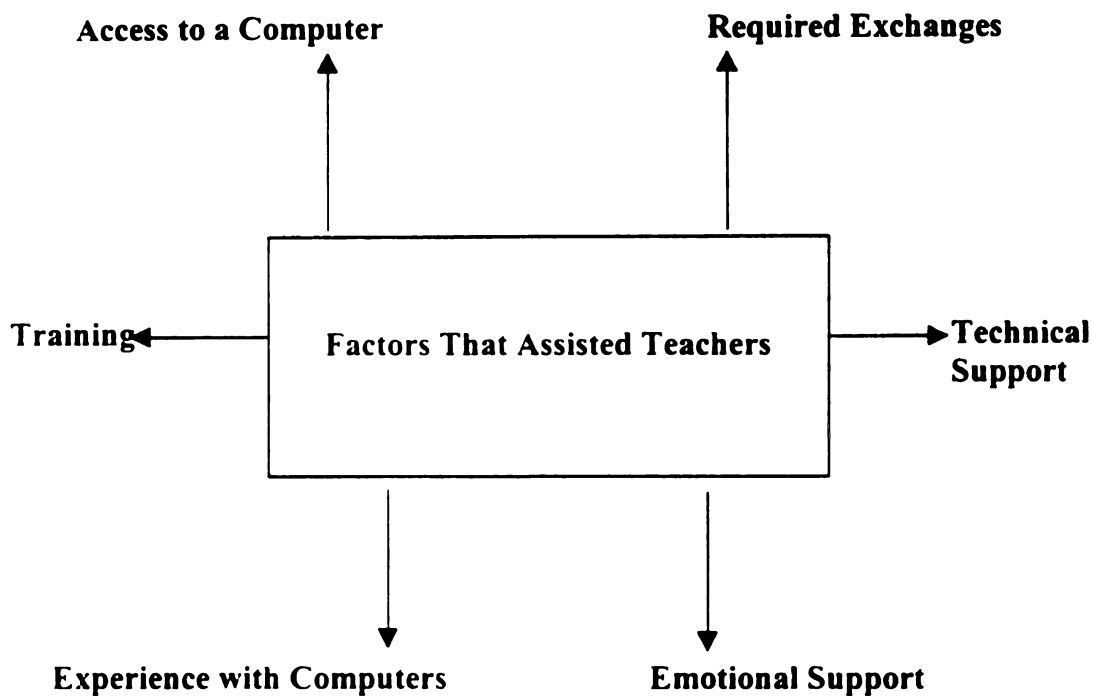
Figure 4.5: Factors that assisted teachers in the use of CMC when developing curriculum.

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Required exchanges: Having a required format for the lessons and requiring that the lessons be attached to e-mail or put on disc–no hard copy–were also mentioned as factors that nudged the teachers into using CMC. Michael stated during a focus group, "Having that format was important. It gave all of us the knowledge of the importance of continuity because we knew that other people would be reading it. We knew the audience and its importance. I teach English and we are always editing and revising. It has made us want to share materials."

The project staff made it clear that teachers and staff would use CMC in developing the curriculum, which was accepted by the teachers, although for some with difficulty. Giving the teachers specific reasons to communicate electronically also served to increase their use of CMC. For example, to participate on the assessment subcommittee, teachers had to exchange ideas electronically. The assessment consultant required this, so the teachers did what was asked of them. He provided a purpose (a requirement) for communicating electronically in the development of curriculum assessment tools.

Training: Computer training was provided to the project teachers. Both the formal and informal aspects of this training were discussed earlier in this chapter. The project secretary commented during an individual interview that the computer training assisted teachers with electronic communication, although this was not widely voiced by the teachers. It is possible that the teachers' level of frustration with the technology in the initial stages of the project was so great that it spilled over to their perceptions of the training. It is worth noting that a few of the teachers in the project valued the initial training, as seen in this statement from one of the teachers in a focus group: "The

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computer training was very helpful [to me] as we began the project." More found the informal training helpful, indicating during the focus groups that having staff, friends, and peers sit with them to walk them through different procedures was what really helped. Most teachers entered the project with little previous computer experience, and by the end of 18 months they were able to navigate the computer well enough to fulfill the requirements of the project. The project director suggested that the formal and informal training opportunities assisted the teachers in the use of CMC for developing curriculum.

Emotional support: In general, the teachers considered the support of the project staff to be a significant help in using CMC. The staff offered encouragement, gave one-on-one assistance, and set up an organizational structure that supported CMC use in curriculum development. Information about useful web sites was sent to the teachers. Also, since lessons were sent to the curriculum specialist, if a teacher had a computer glitch, the curriculum specialist was able to retrieve lessons previously sent to him and then e-mail them back to the teachers.

The ability to edit lessons back and forth with the curriculum specialist and with a partner was also seen as an assistance. One teacher mentioned in a focus group, "I liked the support from Terry. He made me feel like I could do it [use the computer]." Teachers noted a sense of accomplishment as important for persevering. Rene affirmed, "I have to say that I am really proud of what I have learned to do. It makes life so much easier to know how to use the computer. Terry didn't give up on me." CMC also helped to maintain a connection among the project staff and the teachers. A couple of teachers mentioned that without CMC they would feel "out of the loop" as far as project communication was concerned.

The curriculum specialist pointed out that the key to encouraging the teachers to use their computers is for them to see colleagues and peers using CMC, to hear about the experiences of others, and thereby learn of the efficiencies offered through CMC as a tool for curriculum development. Project staff commented on the importance of emotional support and encouragement to the teachers. The project secretary suggested that the teachers' comfort level with computers affected their use of CMC. Those with a higher comfort level were higher users. The computer support staff suggested that the face-to-face meetings offered encouragement to the teachers in their use of technology because the meetings provided the opportunity to ask questions and seek help face to face.

Factors that deterred. Five factors are identified here that deterred teachers in their work to develop the philanthropy curriculum. These factors are depicted in Figure 4.6.

Fear or Discomfort   Frustration with Technology

Perceived
Lack of   Factors that Deterred   Too Much to
Structure   Teachers   Learn at Once

Lack of Knowledge Regarding
Computer Capacity
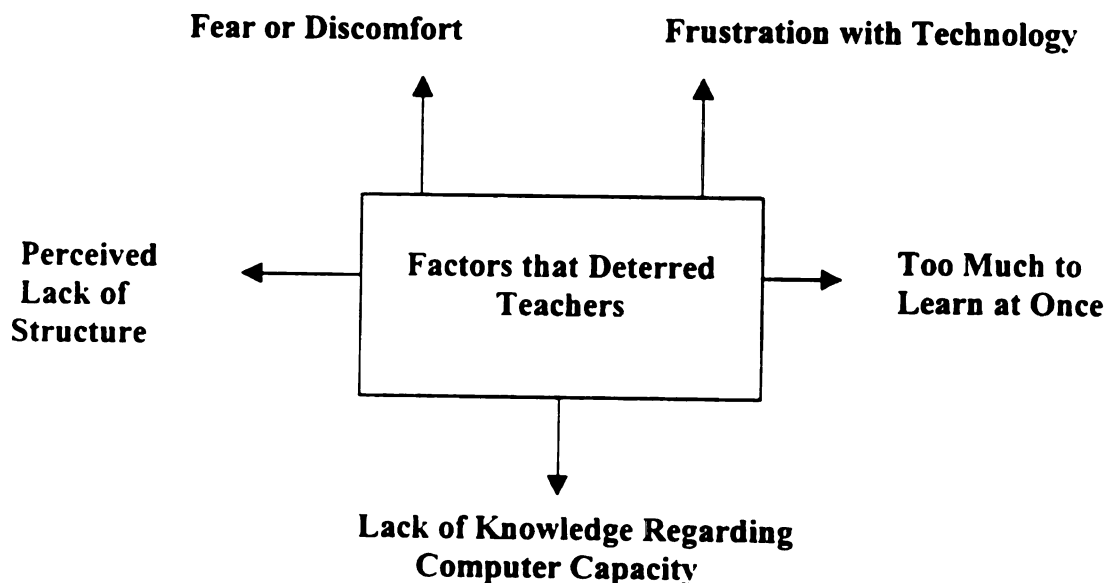
Figure 4.6: Factors that deterred teachers in the use of CMC when developing curriculum.

Fear of disclosure and discomfort: A factor brought up by project staff that deterred teachers from using CMC in developing curriculum centered on the fear of disclosure–that one's ideas may be criticized or that a mistake could be made. "No one wants to look like an idiot!" is a telling declaration made by one of the technology support staff. This sentiment was echoed in a variety of ways by staff and teachers alike. To share one's writing on-line can be a disturbing experience for even a seasoned computer user. The assessment specialist noted, "Some teachers didn't want to share until it [their work] was perfect. They didn't want to share until they were proud."

During an individual interview, the curriculum specialist remarked, "By putting lessons out there the teacher could be exposed to instant criticism." An example of the concern felt by the teachers can be seen in this comment made by a secondary teacher during one of the focus groups: "We were constantly asking ourselves if we were the only ones who did not have a clue." Fear of the unknown–or of looking foolish–deterred the teachers who were inexperienced computer users from using CMC, particularly in the first year of the project. Henry, a high school teacher, offered, "At first we had so much reading to do and I hadn't read the assigned work. . . . I didn't dare use e-mail because I thought someone would ask me a question about the reading and I wouldn't know the answer . . . so I laid low." Henry thought e-mail would expose him in front of the larger group. His comment was made in relation to the considerable amount of reading assigned at the beginning of the project. He had not read all of the articles and other materials provided. His concerns may have come from the culture of teachers, where assignments are given with an expectation that they will be completed, and teachers are used to being the experts with the answers.

Related to fear of disclosure is the discomfort felt by some teachers for sharing their work. Neither "fear of disclosure" nor "discomfort for sharing work" was referred to in the literature reviewed for this study. Yet, in this research these issues were raised by staff as well as by participating teachers. Both the project director and the curriculum specialist noted that teachers were hesitant to share their work, particularly in the beginning of lesson development. During a focus group of secondary project teachers, the researcher asked the group what kept them from sending lessons to other teachers. Elaine said, "There is a common element–in high school especially–we tend to work in our own isolated areas. . . . [It was hard] coming into the project, sharing my work with total strangers." Cherise then pointed out, "There is also that sense of ownership when you author anything, and not wanting someone else to take your idea . . . and you guard it, you guard it." This perspective was not shared by the entire group, as is made clear by Stephanie's comment: "I disagree because I'm really a sharer–maybe I'm an old hippie from the sixties . . . I think if you've got an idea, share it because if it works for your students, it will work for other students." Group members indicated that they shared the drafts of their work at face-to-face meetings and considered it helpful. When a group of secondary teachers were asked why they did not share drafts electronically with the other project teachers, the response was, "Nobody told us to." Responders in the elementary focus group stated that they felt comfortable sharing their work with other teachers.

Frustration with technology: The teachers freely voiced their initial frustration with computer technology. An example of this frustration is apparent from these remarks made by one of the project teachers during a focus group: "At first I knew absolutely

nothing [about my laptop]. I understood nothing. I was so discouraged and felt very frustrated. I didn't know what to do, and I didn't want to touch it."

One staff member noted that a couple of teachers did not want to touch their computers at first. As teachers became more knowledgeable about and more comfortable with computer technology, the fear lessened or even disappeared. In *Journal Round 1*, one of the teachers wrote, "I think the most frustration I have felt during this entire experience is with my computer." Another teacher's entry proclaimed, "COMPUTERS! A major frustration!" Still another journal entry recounted, "The computers have been a challenge. I had very limited computer skills at the start of the project. The first couple of months were extremely frustrating as I attempted to become computer literate." By *Journal Round 2*, the teachers provided repeated assurances that their comfort levels had gone up once they had become familiar with their computers. When asked, "How do you now feel about computers and e-mail?" teachers recorded in their journals such responses as "I love my computer," "I am feeling much more confident using the computers," and "I feel a lot better about using my computer."

The lack of experience with computers was noted earlier in this chapter under Subquestion 2a. Certainly a factor that had a negative impact on the use of CMC for curriculum development involved the lack of computer skill and experience of many of the project teachers. This circumstance not only slowed the pace of the project, it caused the teachers great frustrations. In addition, when individual teachers experienced mechanical/technical problems such as modem problems, computer crashes, and difficulty getting on-line because of issues related to their particular Internet providers, as well as problems posed by district fire walls, the occurrences caused the teachers considerable anxiety.

During an individual interview, one of the computer support staff concluded, "Not knowing how to fix the problem, not knowing how to 'make it happen' was at the center of this anxiety and frustration." Conversely a *Round 2* journal entry revealed, "I am feeling much more confident using the computers. I have become a pretty good trouble shooter."

Perceived lack of structure: During the first few months of the project, the teachers struggled to understand the expectations for their work. Even though the teachers had all participated in curriculum development efforts in their districts before their involvement with the K-12 Education in Philanthropy Project, none had been a part of a project that employed CMC as part of the process, nor had they been involved in a statewide effort. They described a strong desire to have very clear and specific directions. During a focus group, one of the teachers stated, "We needed clear, specific directions, a layout, time line, and expectations." In a different group, another teacher recalled, "There was initial stumbling with the project. . . . There was a concept, but no one knew where we were going. We weren't real sure what we were supposed to do." DiMauro and Jacobs (1995) discussed the importance of beginning a networked project with a common understanding of the expectations for the participants of the network. It has been the experience of the researcher that in the initial phases of curriculum development, teachers require very specific direction regarding the process and their role in the process. Even when this is provided, some teachers think that it is not enough. Not all project teachers thought there was an initial lack of direction for the project, and this was mentioned during the focus groups. In this project the leadership provided a mission, overview, and

direction for the curriculum work from the beginning. Some of the teachers seemed to need more clarity and direction in the beginning of the project than others.

Too much to learn at once: The teachers stressed that they were overwhelmed by the competing demands of the project in the beginning while they were learning to use computers. They were given a substantial amount of material to read about a new area. Learning new content and computers at the same time was difficult and interfered with the use of CMC for curriculum development. During the focus group this was brought up by a number of the teachers. One stated, "We had an overwhelming amount of reading. I couldn't learn it all at the same time." Another added, "They tried to teach us too much. . . . We were just given so much information, it was hard to know where to start–the computer, the readings, where?" Henry's comment noted earlier under Fear of Disclosure is another example of the effect of having so much to learn at once. In Henry's case, he was hesitant to use e-mail because he had not read all the material provided. Within the focus groups, the teachers also remarked that they felt that they now had a better handle on the content of philanthropy and were more skilled using computers.

Lack of knowledge regarding the capacity of computers: People who lack knowledge and experience with computers may not understand the computer's capacity. A noteworthy perspective on the effect of lack of experience with computers was offered by the curriculum specialist: "Teachers who haven't used or seen the value of computers do not see a reason to use them. They do not see the potential. They are unable to visualize what a powerful tool a computer is." During a focus group, one of the few teachers who entered the project as a skilled computer user reflected, "Before you use a computer you have no way of knowing what it can do. You just can't understand its

capacity, so you don't use it. Once you have experienced it, then you understand and it becomes part of how you do things." The first journal entries detailed the teachers' many frustrations with computers and the project. In the later two journals, they made reference to how useful the computers had been to their work in the project and in their classrooms. Once they had the skill to use the computer, the teachers were then able to grasp the capacity of the technology for curriculum development as well as for other uses. The literature on curriculum development in a networked project pays scant attention to the effect of computer experience or inexperience on perception of computer capacity. However, Rogers (1983) noted that the motivation to use a new technology may be related to perceived advantage of use, such as a capacity to do something faster or better than before.

Summary. An analysis of the focus group interviews, staff interviews, samples of e-mail exchanges, and journal entries identified factors that assisted the individual teachers when using CMC for curriculum development as well as factors that deterred CMC use. Having access to a computer, technical as well as emotional support, and computer training were factors that assisted the teachers when using CMC as a tool when developing curriculum. Experience with computers and being required to communicate electronically also served to assist them.

Those factors that deterred teachers from using CMC when developing curriculum included their fears of disclosure, which in some cases was evidenced in a hesitancy to share lessons. Further, frustration with computer technology, being responsible for learning both content and computer skills during the same time period, and a perceived lack of direction at the beginning of the project all had the effect of deterring some of the

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participants from using CMC for curriculum development. Finally, teachers' inability to understand the capacity of the computer, brought about by their lack of computer experience, also hindered their use of CMC for curriculum development.

<u>Research Question 2c</u>

What role, if any, does CMC play in building a sense of community?

The final section of Research Question 2 explores the role that CMC played in building a sense of community among the teachers and staff of the project. These considerations are grounded in the data collected for this study.

<u>Mechanism for keeping in touch.</u> CMC played a role in building a sense of community in this project by offering a mechanism for sharing information, keeping up communication established during face-to-face meetings, reaching out through humor or anecdotes, providing affirmation and feedback, and building agreement through the exchange of lessons and ideas. During a focus group one teacher noted, "I feel like this is my extended family," suggesting that CMC helped form that bond. Another mentioned, "I have discussed personal and professional issues with some of the other people in the project. E-mail makes this easier to do sometimes." The role that CMC can play in building a sense of community has been noted in the literature on CMC. Sproull and Kiesler (1991) wrote, "It may seem paradoxical that computers, stereotyped as cold and impersonal, can be used to increase personal connections and affiliations" (p. 101). Weir (1992) suggested that network exchanges provide an opportunity for collaboration and cooperative learning. Others have supported the potential for computers to build community and affiliation (Eurich-Fulcer & Schofield, 1995; Turkle, 1995).

Grade-level differences. The elementary teachers differed from the secondary teachers in their perceptions regarding the role of CMC in building a sense of collaboration. Initially, however, it was difficult for both the elementary and secondary groups to let go of the notion that an either-or situation existed: Either it happened face to face, or it happened through CMC. Not only did the elementary teachers report communicating more electronically than did the secondary teachers, they were able to easily cite examples of how CMC enhanced their relationships as a group. During a focus group comprised of elementary teachers, they offered the following examples. Through CMC they shared personal information, asked questions, requested and offered emotional support, and exchanged recipes as well as information relevant to the project. The elementary teachers thought that they communicated frequently using electronic communication and that this helped build a sense of community, a sentiment not shared by the secondary teachers.

In general, the secondary teachers did not see CMC as having played as large a role in building a sense of community. One high school teacher even suggested that it played no role at all. Another noted that she "didn't think to communicate much electronically. Now I will." It is noteworthy to mention here that while discussing electronic communication earlier in this focus group, one of the teachers mentioned that she did not communicate with other project teachers because "nobody told us to." Most secondary teachers, upon consideration, could point out the role CMC played. One middle school teacher commented, "Our identity has evolved and we now can communicate [electronically] on a personal level." In a different focus group, a high school teacher remarked, "It [CMC] keeps the communication going between meeting

times." Both elementary and secondary teachers stressed that they did not believe electronic communication could replace face-to-face communication.

Role of staff. During all three focus groups, the teachers indicated that they felt a real sense of collaboration with the project director, secretary, and curriculum specialist. These are the people with whom they communicated electronically most frequently. One teacher mentioned, "I feel a certain comfort zone when communicating with them because of the frequent electronic contacts." Another pointed out that the project secretary sent them an e-mail about how everyone could jazz up communications with emoticons such as smiles. This statement caused others in the focus group to nod and smile. In addition, the secretary and project director regularly sent e-mail with inspirational messages attached, another factor that the teachers indicated brought people together.

The project staff offered varying opinions on the role that CMC played in building a sense of community. The curriculum specialist and project secretary maintained that CMC played an important role in collaboration and building a sense of community. They mentioned that CMC allowed participants and staff to keep in touch. It also gave staff the opportunity, as the curriculum specialist noted, "to let them know we are thinking about them and to say 'Thanks.'" He further stated that through CMC the teachers affirmed each other. The secretary stressed, "It [CMC] had a tremendous impact. The teachers have shared ideas and allowed others to edit their work." However, the assessment consultant did not believe that CMC had built a sense of community or helped with consensus building. During an individual interview he surmised, "CMC has not been effective for consensus building. Consensus building occurred during the face-to-face meetings." He further stated that dialogue can be a problem using e-mail: "There needs

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to be some structure to it that puts an order on it [the dialogue]." Although the project

director stated that she had expected more electronic communication and, therefore, more

coming together as an electronic community, she did believe that CMC had played a role

in building a sense of community. She stated, "With electronic communication the staff

and teachers can stay in touch without the formality of a letter or the inconvenience of

reaching someone by phone. It has helped develop continuity in the project."

Summary. When discussing the role, if any, that CMC played in building a sense

of community within the project, the teachers had difficulty letting go of the idea that an

either-or situation existed relative to communicating electronically or face to face. Once

they focused on the role of CMC, they were able to speak to the role it played in building

a sense of community. The elementary teachers, curriculum specialist, and project

secretary voiced the sentiment that CMC had played a positive role in building a sense of

community within the project. The project director agreed, but suggested that the amount

of CMC fell short of her expectation for engagement as she had originally envisioned the

project. These were all project participants who related that they used CMC as a regular

part of communicating with each other. The secondary teachers and the assessment

consultant did not view CMC as playing a large role in building a sense of community.

However, the secondary teachers were able to provide examples of how CMC helped

build a sense of community.

Two factors may influence this difference in perception between elementary and

secondary teachers regarding the role of CMC in building a sense of community. First, the

elementary teachers reported communicating more often and with more people than did

the secondary teachers. This higher level of participation could account for their

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perceptions. A second factor may lie in the culture of the elementary school versus the secondary school. Elementary teachers are very used to working together because they generally teach all subjects. Secondary teachers work together in different ways, and mostly through a subject or department structure. The difference in the levels of participation between elementary and secondary teachers has not been addressed in the literature on curriculum development in a networked project.

Summary of Findings for Research Question 2

CMC has had an impact on the process of curriculum development and on the individuals involved in that process. Although this impact on the curriculum development process and on individuals has been discussed as if the factors involved fall into discrete categories, this is not the case. The use of CMC for curriculum development influences both the process and the individual. The process and the individual also influence each other. However, for purposes of discussion, the findings were assigned separate categories.

A number of factors inhibited the use of CMC when developing curriculum. Lack of experience and competence with computer technology have implications both for the general process of curriculum development and for the individual developing the curriculum. Because the teachers lacked skill in using computers, they required training and support. Their lack of experience also caused frustrations and an inability to envision the capacity of using CMC when developing curriculum. Other factors inhibiting the use of CMC included the unreliability of computer support systems, inadequate technical support, and lack of time. Further, issues related to the medium itself had an inhibiting

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influence. The inability to brainstorm in a face-to-face group was seen as a definite drawback of CMC. In addition, misunderstandings and communicating without affect, which are characteristic of CMC, inhibited the process.

Six factors related to the use of CMC when developing curriculum enhanced the process. The use of CMC reduced problems associated with geographic distance, an important feature because the teachers and staff were spread throughout the state. CMC also provided for asynchronous communication, allowing project members to send and receive messages at their convenience. CMC further allowed the participants and staff to communicate in real time. This eliminated the need to send lessons and materials by regular mail, a very real time savings for the project. Two other factors are the ability to correct lessons on-line and access to on-line resources. A final way in which CMC enhanced the curriculum development process is that it offered a system for information and lesson management.

An analysis of the data also revealed factors that assisted and those that deterred teachers from using CMC when developing curriculum. Of those factors that assisted, having access to a computer had an obvious impact. Without the computers provided through the project, and in a few cases the local community foundation, the majority of teachers would not have had ready access to a computer for CMC. Other factors that assisted teachers included the computer training, experience using computers, and technical and emotional support. A final factor that assisted teachers in the use of CMC when developing curriculum involved being required by the project staff to send messages and attachments electronically.

On the other hand, the fear or discomfort associated with sharing information electronically deterred teachers from using CMC. Frustration with technology, which was related in some ways to their lack of experience using computers, also was a factor that deterred engagement in CMC. As mentioned earlier, this lack of experience also limited their understanding of the capacity of computer technology. In addition, the teachers suggested that aspects of the project that occurred in its initial months had a deterring influence. These included a perceived lack of structure at the beginning of the project and being overwhelmed by having so much to learn at once.

For many members of the K-12 Education in Philanthropy Project, CMC helped to build a sense of community. This was particularly true regarding the teachers and their relationship with project staff. The elementary teachers considered CMC useful in building a sense of community, as did the curriculum director, the project secretary, and the project director. The secondary teachers and the assessment consultant did not see CMC as playing a large role in developing a sense of community within the project. Both secondary and elementary teachers stated that the face-to-face meetings did more to build community.

CHAPTER V

SUMMARY AND CONCLUSIONS

Research Summary

Employing an ethnographic approach, this researcher examined the impact of

CMC on the development of curriculum units by geographically dispersed, practicing

teachers. The researcher investigated the ways in which CMC enhanced and/or inhibited

classroom teachers in the development of lessons and units for a K-12 curriculum in the

teaching of philanthropy and civic responsibility. The Council of Michigan Foundations

sponsored this multimillion-dollar curriculum project to develop a comprehensive,

articulated group of lesson units for grades K-12 in the teaching of philanthropy and civic

responsibility and its importance to a democratic way of life. Forty-three teachers from

both public and private schools across Michigan participated in this initiative, called the

K-12 Education in Philanthropy Project. A full-time director, curriculum specialist, and

secretary comprised the staff for the project. In addition, services were purchased from a

nationally known assessment consultant and Michigan State University for computer

support and training.

In the early summer of 1997, the teachers were chosen to participate in this project

through a competitive application process. That fall they received computers, computer

training, and (for some) release time from their teaching responsibilities. The teachers

developed lessons during the fall and winter of that year, and began field-testing during the

spring and into the fall of 1998. In the months following field-testing, final edits to the lessons were made. During the lesson development and field-testing phases, the teachers and project staff, including consultants, communicated both electronically and in face-to-face meetings. By the spring of 1999, a group of 100 lessons had been developed. These lessons make up the first phase of the curriculum for the project. Phase two of the project began in June 1999, with the addition of 30 teachers.

This researcher followed the teachers through phase one of the K-12 Education in Philanthropy Project as they learned to use their computers, developed lessons, attended conferences, and met in small and large groups to digest and discuss their work. Insights regarding the process and teacher perceptions were gained through both face-to-face meetings with the teachers and staff and by studying archival data. In addition, the researcher participated on the Michigan State University team evaluating the project and as a member of the K-12 Education in Philanthropy Project Steering Committee.

The archival data reviewed for this research included a year-one formative evaluation report consisting of a baseline survey, a report on round one of the journals, and a report on stakeholder interviews; two other journal rounds; e-mail samples; and an evaluation report on teacher practices. Through three separate focus group interviews, the researcher met with nearly half of the participating teachers. Interviews were also held with the project director, curriculum specialist, project secretary, assessment consultant, and two staff members from the Michigan State University Computer Center. All data sources served to enlighten the researcher regarding the impact of CMC on the curriculum development process, but it was the words of the teachers themselves that added the spice to the stew. Through three journal rounds and three focus group interviews, the project

teachers revealed their deepest frustrations and concerns, along with their joys and accomplishments, progress marked in their own words.

During the data-analysis phase for this study, the researcher sifted through interview transcripts, journals, and survey data, as well as samples of e-mail responses and archival data sources. Code words were assigned to significant phrases, sentences, or paragraphs, and these code words were then grouped into categories. The categories were further refined into general themes.

Themes

In analyzing the data on the impact that CMC has on curriculum development, five general themes emerged that are important when considering the primary research question of this study. These themes, depicted in Figure 5.1, identify those factors, both positive and negative, associated with the impact that the use of CMC has when developing curriculum in a networked project. The themes are offered to provide a framework for considering the use of CMC when developing curriculum. In reality, they do not exist as stark, separate entities; rather, they weave their way throughout the project. The themes are organized under the following headings: Technical/Mechanical, Organizational, Context, Individual Use, and Curriculum Development. In this section, each theme and those factors related to the theme is considered in turn, discussing their relationship to the impact of CMC on curriculum development. The discussion of the themes is grounded in the data presented in Chapter IV. The themes referenced in Figure 5.1 assist in understanding the impact that CMC has on the development of curriculum by geographically dispersed, practicing teachers.

Technical/Mechanical

System Reliability
Access
Technical Support

Organizational

Project Leadership
Planning and Management
Support and Sharing
Information overload

**Themes
Associated with
The Impact of CMC
On Curriculum Development**

Context

Organizational Norms
Prior Opportunity
Organizational Support
Gender ?
Grade Level

Individual Use

Time
Family Support
Purpose
Commitment
Emotions

Curriculum Development

Asynchronous Communication
Flexibility
Time and Distance
On-Line Editing
Lesson management

Figure 5.1:   The impact of CMC on curriculum development.

Technical/Mechanical

The impact of CMC on curriculum development in the K-12 Education in Philanthropy Project was affected by technical/mechanical factors. These factors encompass the mechanics and technical issues involved in keeping a networked system running. Included within this theme are the factors of:

1. System reliability—whether a computer system consistently operated in a way that met the demands of the project.

2. Access—availability of a computer and the opportunity to use it.

3. Technical support—technical assistance provided to set up the computers and keep the computer system running.

The reliability of the computer system has been noted in the literature as a factor that has an impact on curriculum development in a networked project (Coulter & Feldman, 1995; Eurich-Fulcer & Schofield, 1995). This certainly makes intuitive sense because a computer system would need to be consistently working for people to communicate with each other. The K-12 Education in Philanthropy Project purchased service for project participants through Internet providers or used those providers already in place through the teachers' local school districts. Occasionally, service through one of the Internet providers was interrupted. When that happened, teachers were unable to communicate using CMC with other teachers or the project staff, nor were they able to access the Internet for research purposes. However, the project director and curriculum specialist reported that the systems were generally available for the project participants.

Another element of system reliability involves computer capacity and uniformity in software. Through the project, the teachers and staff were provided with state-of-the-art

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computer equipment to which uniform software was added. Because the computers were new and the software was installed before reaching the teachers, problems of reliability and access were reduced as compared to working with nonuniform (and perhaps older) equipment and software.

Certainly access to the computers had an effect on the use of CMC to support curriculum development, and this is well documented in the literature on CMC (Coulter & Feldman, 1995; Eurich-Fulcer & Schofield, 1995; Riel, 1990a; Weir, 1992). During the focus group interviews, the teachers indicated that having access to a computer affected their frequency of use. Initially, some teachers did not have computers or their systems had not been set up yet. During that time those teachers, who did not already have easy access to a computer, did not engage in CMC. Also, a requirement of the project entailed keeping the desktop computers at school for the first semester of the project. This limited access to the computers to school hours, or caused teachers to have to visit their buildings in the evenings or on weekends, an option not available in all schools. In addition, a teacher's computer and classroom were not always in the same location. During the focus group interviews, the teachers noted that they used their computers more once they took them home because they had little time at school to use them.

Computer access can be seen in two ways. First, there is the access that comes from participants' being given their own computers for the project. The second issue of access goes to the opportunity to use the computer. Those factors that had an impact on a teacher's opportunity to use the computer include system reliability, time, and computer availability. As noted above, because the computers were not always in a place where the teachers were, the computers were not available to them to use. Another factor affecting

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availability included district fire walls, mechanisms installed on computer systems to screen out material that could be considered inappropriate.

Local district fire walls presented an unanticipated barrier to communication and to conducting research. Although the fire walls were installed to protect students from undesirable information available through the Internet, they also kept teachers from visiting web sites that could further their research and from communicating with other project members. During the focus groups, a few of the teachers reported that they were unable to communicate via e-mail in the first months of the project because of the fire walls. Local district technical support staff had to be contacted to overcome that problem.

Technical support to the teachers emerged as important to this networked project, both for getting the computer systems set up within districts and for assistance during the project, particularly when the teachers were first learning to use their computers. The project director, in an individual interview, noted that in-district technical support was not uniform across the districts in the project, and it was very problematic in one of the large urban districts. This situation was also apparent when reviewing the teacher journals. Even without a special project to contend with, technical support is stretched in most districts in Michigan, as affirmed by the Director of the Michigan Association of School Administrators. Add a special project to the workload of the technical support staff, a very busy time of year—the fall—plus competing demands by administrators, and it is not surprising that the in-district technical support was not always available. However, technical support was made available to the teachers. The project provided a help desk through the Michigan State University Computer Center, a 1-800 number that was

available 24 hours a day, support from the project staff, and eight hours of computer training.

In summary, the technical/mechanical theme includes factors that had an impact on the use of CMC in this project. These factors are intertwined, exerting an influence on each other. When considering the impact that CMC had on curriculum development in this project, the effect of mechanical/technical factors is significant. The reliability of the system, whether it consistently functioned, determined whether or not teachers could communicate and conduct research electronically. Access to the computer was affected by system availability and opportunity to use the system. With access, project members could engage in CMC; without it, they could not. Finally, the technical support available to the teachers determined when the system was installed and how quickly technical questions could be answered.

Organizational

The second theme associated with the impact that CMC has on curriculum development involves those factors falling into the organizational portion of the project (see Figure 5.1). Organizational factors are those factors that are related to the overall management and planning of the project. The elements of this theme include project leadership, planning and management, support and sharing, and information overload. These elements helped to determine whether teachers were able to engage in CMC for curriculum development.

As detailed in Chapter IV, project leadership played a crucial role in how, why, and whether project teachers used CMC for curriculum development. The project

director designed the project in such a way that CMC was crucial to on-going lesson development. Computers were provided to the participating teachers. Further, computer training and support were incorporated as part of the project. Project staff required that lessons and assessment tools be sent electronically. Also, the director and curriculum specialist provided a purpose for communicating, and offered great moral support and organization to the project. Finally, the project director developed a commitment to the project through dynamic and inspirational leadership. This project organization helped to create a project that enabled the teachers to communicate electronically and required that they did so.

The project leadership identified CMC as a crucial ingredient for a curriculum project involving participants and staff who were spread throughout the state. This part of the project plan was well understood by the project teachers. A number of teachers stated during the focus groups that other aspects of the project were not as clear to them at first. Others found the expectations to be quite clear. DiMauro and Jacobs (1995) pointed out the importance of beginning a networked curriculum project with clear expectations for the participants.

Another organizational factor associated with the use of CMC in a networked project is the impact of project planning and management. Through the use of CMC, project staff were able to maintain a record of all transmissions to each other and to project teachers. CMC also assisted in planning the face-to-face meetings and for follow-up after the meetings were held. Research opportunities were transmitted to the teachers through the web site. Further, information was managed through CMC. For example, the

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required lesson format was provided to the teachers as an attachment to an e-mail message.

CMC allowed the project staff to offer emotional support to the teachers as they worked their way through the knotty problems associated with the technology and as they developed their lessons. The project director and secretary regularly sent inspirational messages to the teachers, and the curriculum specialist extended continual support through regular e-mail contacts. To a great extent, it was through CMC that the information of the project was shared. Everything from web sites to meeting notices to recipes was sent via CMC. The effect was fewer meetings, excellent records, the ability to share information in real time, and an organizational tool that assisted in planning efforts.

A related organizational factor, which is referred to in Figure 5.1 as Project Overload, entails the significant amount of new learning required in the first months of the project, including technical skill and new content. There is some disagreement as to whether or not the provided readings were required. The teachers indicated that they thought the readings were required and felt stressed and overloaded because they were also learning to use the computers at the same time they were expected to read about a new content area. Also, this all happened at the beginning of the school year, a very busy time for teachers. They thought that the amount of reading required presented a barrier to learning to use their computers and, therefore, to using their computers for CMC.

In summary, project organizational factors affected the use of CMC for curriculum development by providing a structured and orderly system that served to make CMC possible and to encourage its use. This supports the work of Eurich-Fulcer and Schofield (1995), who identified organizational commitment and support as important factors

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affecting wide-area network usage in schools. One feature of the project that surfaced in the first months that appeared to hinder the use of CMC for curriculum development for a number of the teachers involved the hefty amount of reading required, simultaneous with learning to use their computers.

Context

The third theme associated with the impact of CMC on curriculum development encompasses factors related to the context of schools. These factors include organizational norms, prior opportunity, organizational support, gender, and grade level, and are shown in Figure 5.1.

Fetterman (1998) wrote that the emic perspective, or insider's view of reality, is important to understanding situations and behaviors. In this regard, it is important to consider the context in which the project teachers worked and the impact that context may have exerted on the use of CMC for curriculum development. In the schools of today, teachers are generally isolated from other professionals because they spend most of their workday in individual classrooms with students. Barth (1990) even suggested that this isolation can extend beyond the classroom into the lunch room. Because of this isolation, teachers have few regular opportunities to work collaboratively with other teachers. A networked project could provide a break in this isolation, but it requires that teachers behave in different ways than they are accustomed.

Along with a school structure that encourages teacher isolation, there is a hesitancy on the part of some teachers to share their lessons or activities. Why this occurs is unclear, but it may be that one of the few ways in which teachers can stand out from the

crowd is through their own lessons and activities. The fact that this does occur and that teachers lead rather isolated lives at school has implications for using CMC as a tool when developing curriculum because both have the potential to influence how open teachers are to collaborating through CMC in the development of lessons.

It has been this researcher's experience as a principal and an assistant superintendent for curriculum and instruction that the more competent teachers, the high achievers, are the ones who volunteer to assist in curriculum writing. Achievers may be more likely to self-select for participation in a curriculum-writing project. The literature on curriculum development reviewed for this study did not include a reference to this circumstance. People who are achievers generally hold a high standard for the quality of their work. This was seen in the project teachers through their reluctance to share lessons or assessment tools until everything was perfect. Teachers are also the "holders of the knowledge" within their domains. They have information that students must learn, so they are in a special position of power and authority. The project director thought that this position of power and authority caused some of the teachers to be reluctant to ask for computer assistance from their students. Certain teachers were simply not comfortable asking for help from their students. This example of teachers as the purveyors of all content knowledge introduces and reasonably supports the suggestion that attitudes of teacher-student relations can prevent a community of learning. Barth (1990) wrote about the importance of building a community of learners within schools where "adults and children learn simultaneously and in the same place to think critically and analytically and to solve problems that are important to them" (p. 43). In Barth's community of learners, learning is very much a part of the school culture and is mutually visible.

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The project staff and consultants voiced surprise at how unskilled with computer technology the majority of the project teachers were at the inception of the project. These teachers had limited access to computers and/or no compelling need to learn how to use them before their involvement in the K-12 Education in Philanthropy Project. There exists a rather wide divergence in the availability of computers to classroom teachers. In some districts, several computers are available in every classroom. There are districts where computers are located in a lab on another floor in the building; in others, computers are available only to the computer classes. For whatever reason, many of the teachers entered the project with scant previous computer experience and skill and little training.

Prior access to computer training had an impact on uses of CMC. Those without prior experience and skill with computers did not readily engage in CMC. The journals and the focus groups both yielded reports that the teachers' time was spent becoming familiar with their computers. In the Baseline Survey, Silver (1998) reported,

> Whereas three out of four teachers had a fair amount or a lot of experience with word processing before they began working on the Project, only one out of four had a fair amount or a lot of experience with a modem or the Internet, and only one out of five had a fair amount or a lot of experience with e-mail or downloading files from the Internet. (pp. 17-18)

He further pointed out that two-thirds of the teachers fell into the group with "little previous experience" using computers. Those coming into the project with previous computer experience and skill began using CMC right away. They soon discontinued CMC with other teachers because of lack of response. Instead, they kept in contact with the project staff using CMC. This lack of prior computer experience and training is what one of the computer consultants referred to as "opportunity cost" because the opportunity

to use a computer or for training had not been part of the teachers' prior experience, which resulted in a "cost" to the project.

In this project the teachers had varying degrees of local district organizational support. No clear pattern could be found. In the journals, most notably *Journal Round 2*, the teachers discussed organizational support from the perspective of release time for the project. One entry stated that the writer had been granted "very little release time in spite of encouragement given to get involved at the beginning of acceptance into the program." Another entry indicates that the school had agreed to release time, but that had to be renegotiated each month. Still another commented that release time had been given, as well as an office to use for working on the project. Each teacher application to the project had to include the signatures of the principal and the superintendent. Eurich-Fulcer and Schofield (1995), noting the importance of administrative support to a networked project, suggested that without the support of the top administration, a computer network will fail to be used to any large extent.

In the initial phase of the project, 55% of the teachers described the support they received locally as fair or poor, noting greater support from the principal than from their peers (Silver, 1998). A year later, during the focus groups, the teachers voiced that they received varying levels of organizational support. The support ranged from what one elementary teacher referred to as an "incredibly supportive" principal to what another reported as "no support in my school at all." A few teachers mentioned that their principals were somewhat supportive, but were so busy with other aspects of running a school that they were not able to provide much support. The fact that the project

emanated from outside the school was mentioned as a reason for the lukewarm support provided by some of the principals.

What can be surmised from the information presented above is that for a project organized from outside the school district, organizational support cannot be guaranteed, nor can it be dismissed. Variables such as the teacher's relationship with the principal, how much knowledge was shared with members of the organization before participation and during the project, competing projects within the district, and/or changing personnel could have had an influence on organizational support. These are issues relevant to the local educational community.

The context of a school environment may also hold implications for the effect of gender on CMC. Former studies have shown that gender can play a role in the use of CMC (Cherney, 1994; Davis & Brewer, 1997; Herring, 1993; Hunt, 1996; Turkle, 1997). Herring found a discrepant level of participation between the genders, with females posting shorter and less frequent messages. In the present study, gender did not surface as a factor. Staff members indicated that they had noticed no difference in the frequency or amount of CMC between the men and women in the project. During the focus groups as well, the teachers stated that there existed no difference in communication patterns between the male and female teachers. Reasons for this circumstance may be found within the school context, where many of the workers are women, salaries are contractually set so there is no salary inequity within the teaching ranks, and women hold leadership positions as department or committee chairs. Further, the domain of curriculum development is a highly verbal one, and lesson writing is an area in which women can excel. These are conditions within which a female teacher could feel comfortable sharing

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ideas, and that may have overridden a reluctance to participate in CMC. The only place that gender dominance was apparent came up when teachers talked about the importance of family support. Of the many references made to the support received when learning to use their computers, all comments but one referred to the assistance provided by a husband or a son.

The focus group interviews did reveal a difference in the amount of CMC involvement between the secondary teachers and the elementary teachers. The elementary teachers used CMC more for collaborating and sharing than did the secondary teachers. The elementary teachers remarked that they communicated with a partner and others in the project. Yet, the secondary teachers responded as if it had not occurred to them to communicate with others in the project. They stated that they would have used CMC with other project teachers if someone had told them to do it. When asked in one of the focus groups made up of only secondary teachers whether they would communicate with elementary teachers, they laughed. Then one of them stated that they would communicate with elementary teachers if there was a reason to do so. This was not a surprise to the elementary teachers, who indicated that it was because secondary teachers focus on content and elementary teachers focus on people. The belief that secondary teachers are content focused and elementary teachers are people focused travels through curriculum development circles and among elementary staff members. Of course, secondary teachers also care about people, but there is a difference in the way secondary teachers and elementary teachers approach a curriculum development task. It has been this researcher's experience that elementary teachers are more eager to work together and share their ideas, whereas secondary teachers are very focused on their particular content specialty. The

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traditional structure of the American high school encourages such a focus for secondary teachers.

In summary, factors related to the context of teaching and schools affected the use of CMC for curriculum development in this project. Eurich-Fulcer and Schofield (1995) also identified social and organizational context factors related to the culture of schools as having an impact on network use. The very structure of schools helps to define how teachers work together. That teachers are isolated and spend a large portion of their workday in the classroom has implications for collaboration through group work. In the K-12 Education in Philanthropy Project, the secondary teachers did not use CMC to collaborate on lessons with other teachers, but rather worked through the curriculum specialist. The elementary teachers felt more free to use CMC with their colleagues. One finding of this study that is inconsistent with the literature on CMC is that gender did not play a discernible role in the use of CMC. Issues related to the culture of schools may account for this difference.

The lack of prior experience using computers and thereby developing computer skills presented an inhibiting effect on the use of CMC for curriculum development at the onset of the project. Feldman and Nyland (1994) discovered in studying the Network Science Project that although the teachers were experienced in curriculum development, they were not familiar with computer technology or software. The researchers stated that this lack of experience with computer technology presented difficulties in writing the curriculum. Certainly, in the current project the lack of prior experience with computers slowed down the project during its first year.

Individual Use

Figure 5.1 details the general theme of Individual Use and factors that affect individuals as they utilize CMC for curriculum development. These factors include the impact that lack of time exerted on the process, family support when learning to use the technology, whether there existed a purpose for using CMC, the level of commitment the participants felt to the project, and the effect of emotions on individual use.

The factor mentioned most frequently and emphatically that had an impact on the individual use of CMC was the lack of time to learn to use the computer and to develop the lessons and units. Lack of time was offered up as the culprit that kept the project teachers from using their computers for communication to the extent that they would have liked. The lack of time as a factor that has an impact on the use of CMC in a networked project has been reported in the literature on CMC (Coulter & Feldman, 1995; Drayton, 1993; Riel, 1990a, 1990b; Weir, 1992).

Competing demands from their teaching positions, family and community involvement, and recreational activities ate into their time available for project communications and curriculum development. The project teachers were very involved with teaching, co-curricular activities, and family responsibilities, all of which limited the time available to master the computer and make connections with other teachers. The 1998 Baseline Survey indicated that 69% of the teachers reported that, before the beginning of the project, they were actively involved in extracurricular activities at school, and 55% reported involvement in community-based activities.

As mentioned in Chapter IV, the project director had built in release time during the fall of 1997 for the teachers so that they would have time to work on the lessons. This

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proved to be a problem for two main reasons. First, substitute teachers were not available in all districts, and second, the release time came very early in the project. Had release time been available to the teachers during the winter semester of 1998, the teachers may have been able to make better use of the time available. However, the lack of substitute teachers would have remained an issue.

The work of curriculum development involves a significant expenditure of time. It is an issue that has not received much discussion in texts defining the curriculum development process. Pratt (1994) addressed the issue of time only from an implementation perspective. Tanner and Tanner (1980) did not even address the problem created by the amount of time required to develop a curriculum. Fullen (1982), however, did note that the shortage of time is the single most frequently cited barrier in the curriculum development and implementation process. Whether developing curriculum exclusively through face-to-face meetings, as has been the traditional method, or by using CMC to enhance the process, having enough time to do the work of curriculum development is an important factor.

The assistance in using the computer provided by family and friends was seen as beneficial to the project teachers. In the journals as well as during the focus groups, the teachers indicated that this help was important in their learning to use the technology provided through the project. Although the majority of the teachers relied on the help of family or peers, not all teachers had someone in their lives with computer skills. One who did not have someone reported that this was detrimental to her learning to use the computer. The importance of family and peer support was mentioned primarily in relation to the computer training offered through the project.

Another factor that had an impact on individuals' use of CMC for curriculum development is whether or not the teachers thought there was a compelling reason to communicate in this way. This finding takes the suggestion to build in a reason for teachers to contact technical support staff offered by Coulter and Feldman (1995) to another level by building a reason to communicate with each other and project managers. In the K-12 Education in Philanthropy Project, the purposes for communicating were created for the most part by the project staff and included required lesson exchanges and assessment exchanges. An analysis of the data suggests that the teachers had other purposes for communicating–for example, if they wanted information regarding a conference or meeting, or needed a curriculum resource. Further, once the teachers learned to edit on-line, they began to exchange edited lessons with the curriculum specialist.

Another factor that may have influenced the use of CMC, mentioned directly by staff and implied by teachers, was a commitment to an idea or a belief system. The Baseline Survey (MSU Evaluation Team, 1998) reported that the teachers "are strongly committed to the introduction of education in philanthropy in their school curricula" (p. 6). Their view of the importance of this is shown in Table 5.1.

Although commitment to a belief system was not mentioned directly in the literature reviewed for this study, Riel (1990a) suggested that the level of obligation felt by the teacher to use a system regularly has an impact on participation rates in networked projects. It is possible that level of commitment could be tied to level of obligation. Eurich-Fulcer and Schofield (1995) spoke to the issue of motivation to use a computer as

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a factor that influences its use. A high level of commitment to the ideals of a project may increase a teacher's motivation to engage in CMC as a means of developing curriculum.

Table 5.1: Commitment to the Education in Philanthropy curriculum.

How important is it to make education in philanthropy a standard part of your school's curriculum?	Number	Percent
Not at all important	0	0
Not very important	0	0
Somewhat important	2	6
Very important	17	49
Vitally important	16	46

Source: 1998 Baseline Survey (Silver, 1998).

During the focus groups, the project teachers stated a commitment to the beliefs that formed the foundation for the K-12 Education in Philanthropy Project. They voiced a feeling of responsibility to the project that kept them engaged and involved. The teachers made comments about how the project had changed their teaching in a positive way, and some stressed how important involvement in the project had been to them professionally.

A final factor that had an effect on individual use of CMC as a tool for developing curriculum involves the fear of disclosure, such as a fear of looking foolish or a fear of criticism by peers. The staff and consultants indicated that this was not an insignificant issue in getting teachers to share their lessons and work together. Although the staff and consultants clearly stated this as a factor in CMC use, the teachers were not quite as forthcoming. They did occasionally talk about being afraid that someone would ask a question to which they did not know the answer or that they were uncomfortable sharing

first and second drafts of lessons. The teachers did not want to put their lessons out for others to see until the lessons were appropriate for publishing. This hesitancy to share or ask questions brought on by a fear of disclosure slowed the process of lesson writing, and deterred them at times from engaging in CMC for curriculum development. The fear of disclosure was not mentioned in the literature reviewed for the present study.

A review of the impact that factors related to individual use have on the use of CMC for curriculum development yielded a number of findings. The lack of time to work on the project and to learn to use the technology impeded progress in developing lessons. Having adequate time is an important issue for both traditional curriculum work and for that accomplished through a networked project. Family and peer support in the use of technology was a valued commodity to the teachers as they learned to use their computers. The importance of family and peers as part of the informal training in computer use was discussed in Chapter IV.

Having a purpose to communicate using CMC increased its use. A further element that may have had a positive impact on the use of CMC was the high level of commitment voiced by the teachers for the ideals of the project. Finally, the fear or disclosure realized through hesitancy to share lessons and questions may have impeded the use of CMC.

Curriculum Development

The final theme identified in Figure 5.1, Curriculum Development, includes those characteristics of CMC that affect the curriculum development process. These characteristics include the asynchronous nature of CMC, the flexibility it can add to the

curriculum development process, that it has the ability to overcome time and distance, and the options it offers for editing on-line and lesson management.

Davis and Brewer (1997), in their study of electronic discourse, noted that asynchronous communication allows communicators the ability to read postings on their own time schedule. The asynchronous nature of CMC proved to be of substantial benefit for teachers and staff as the curriculum was developed. Asynchronous communication that is available through CMC presents a significant difference to methods of communicating that are used when developing curriculum without the use of CMC.

A further benefit that asynchronous communication offers when developing curriculum is that it interjects flexibility into the process by allowing project staff and teachers to communicate at their convenience. Glatthorn (1997) stated that flexibility is an important ingredient of a curriculum development project because of the complex nature of the work. Project members were able to work at home in the evening and on the weekends, exchanging messages whenever it fit their schedules.

As noted earlier, CMC made it possible for teachers and project staff who were geographically dispersed to participate in this project by providing a way to overcome distance. The project staff and teachers maintained that without CMC they would have had to meet more often, and the director stated that the project could not have taken place if the participants could not have communicated electronically. CMC made it possible to exchange lessons, provide planning information, and structure the project without regard to location of the teachers and staff. Further, CMC allowed for communication in real time, rather than having to rely on the regular mail, planned meetings, or school mail as

the means for sharing information, which would be the means of information sharing characteristic of traditional curriculum development methods.

On-line editing is an option that exists through CMC. Without that option, staff and teachers would have sent hard copy back and forth through the U.S. mail, adding time to an already tight time line. On-line editing offered the luxury of immediate feedback, which was important to a person writing within a particular block of time, such as during a planning time at school. CMC also assisted with lesson management by providing a record of lessons and other communications and a required format for writing the lessons.

CMC eventually added speed, efficiency, and convenience to this curriculum development project. By being provided the option for asynchronous communication, teachers and staff were able to communicate at their convenience. The ability to edit on-line and to have a record of the lessons are two other ways in which CMC had a positive impact on the curriculum development process in this project.

The Impact of CMC on Curriculum Development: A Summary

This research considered the impact of CMC on curriculum development by geographically dispersed, practicing teachers. Given the data analyzed in this study, a number of conclusions can be drawn regarding the impact of CMC as a tool for supporting curriculum development.

Using CMC as a tool when developing curriculum offers certain benefits to the process. CMC increases the communication options in a curriculum development project. Also, it can add flexibility to traditional curriculum development because with CMC comes the ability to communicate asynchronously, which allows curriculum writers to read

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and send messages or lessons and units at their convenience. The ability to send and retrieve material electronically also allows for the possibility of holding fewer face-to-face meetings. Teachers are able to write lessons and send the draft to a curriculum specialist or team member for review and editing. This can be done in real time and without the need for a face-to-face meeting, an important ingredient for a project such as the one studied because the participants and staff were geographically dispersed. Further, CMC offers the option of editing lessons on-line, a technique that has not been available with traditional curriculum development methods. In fact, the literature review on curriculum development revealed no references to the use of CMC as a tool to enhance the curriculum development process. Finally, the management features offered through CMC can enhance a curriculum development project by providing a record of exchanges, easy access to lessons, and the ability to print or forward materials with a click of a computer key. Managing materials in a curriculum project not employing CMC involves the use of hard copy and a secretary making runs to the copy machine.

Factors associated with the use of CMC in a curriculum development project also may impede the process. Lack of computer experience and skill of those involved in the curriculum project can cause the work to lag. To a great extent, the level of computer experience and skill of both the teachers and project leaders will affect the curriculum development process in projects relying on CMC, a finding supported by Coulter and Feldman (1995) and Eurich-Fulcer and Schofield (1995). In the K-12 Education in Philanthropy Project, the majority of teachers were unskilled with computers coming into the project. Offering a computer for participation in the project may have established a self-selected group of inexperienced computer users. It is possible that those without

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computer access were more likely to apply to the project than were teachers with ready access to a computer. This created frustrations for them and for the project leaders, as well as for the teachers with computer expertise. It also increased the amount of time allotted for lesson development and the number of face-to-face meetings beyond what had been originally planned. In addition, because of this lack of skill, the teachers required training and assistance in the use of computers. Because the reliance on CMC has not been a dimension of traditional curriculum development, the concern about computer training and learning curves has not been an issue. The work of curriculum development has traditionally been tackled in face-to-face meetings, with some "homework" being required before the next meeting.

Because computers play an ever-increasing role in our business and social lives, it is likely that, in the future, teachers will enter a project with more computer skill and experience than was apparent with the K-12 Education in Philanthropy Project. However, it would still be prudent to require a certain level of computer competence for a teacher to be allowed to participate in a networked curriculum project such as the one described here.

The reliance on computer systems for curriculum development opens an array of possible problems not apparent when developing curriculum without depending on CMC as a support for the process. Systems must be up to date with uniform software, as well as being accessible, efficient, and reliable. This all requires technical support, which is not readily available in all situations and which could require the expenditure of money. Coulter and Feldman (1995) and Eurich-Fulcer and Schofield (1995) pointed out the importance of adequate technical support for the computer and network systems, and

adequate technical training. In the current study there was evidence that this technical

support is important to both frequency of use for CMC and for the ability to use

computers to develop curriculum materials and for communication.

Other aspects of using CMC as a tool when developing curriculum are worthy of

mention. Face-to-face meetings, which are the backbone of traditional curriculum

development methods, remain an important ingredient even in a networked project. A

recurring conviction of both teachers and staff that surfaced during this study is the

importance of face-to-face meetings as a means to build relationships, share ideas, and

work in small groups. The work of Sproull and Kiesler (1992) supports this belief. They

indicated that electronic communication is no substitute for face-to-face communication;

rather, CMC can enhance traditional ways of communicating. Sproull and Kiesler further

recommended that face-to-face meetings be held in the early stages of a project to help

form alliances with participants. The teachers in the K-12 Education in Philanthropy

Project stressed the importance of these early meetings and indicated that the additional

meetings were important as they learned to use their computers and about the content

upon which the curriculum would be written.

Project leadership plays an important role in the planning, organization, and

sustenance of a networked project. This research supports the finding of others (Eurich-

Fulcer & Schofield, 1995; Riel & Levin, 1990; Weir, 1992) who have identified the

importance of leadership to a networked project. In this study the project leaders served

as a source of information and encouragement. They provided computer equipment,

modeled computer skills, and made it clear that computer use was a requirement of the

project. Further, the project director and curriculum specialist provided inspiration for

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participation in the project, encouraging a commitment to the central beliefs that formed the basis for developing the curriculum. Project leadership stands out as an important ingredient of traditional curriculum development also.

Although CMC opens up avenues for collaboration and cooperative learning (Weir, 1992), the teachers in this project were inconsistent in their use of CMC. Most of the electronic communication used by the teachers occurred between individual project teachers and the curriculum specialist or the project director. Within the assessment subgroup, teachers had begun to share assessment rubrics because the consultant structured this expectation. With few exceptions, at the secondary level, the K-12 Education in Philanthropy Project teachers did not engage one another in electronic communication for the purpose of curriculum development. The elementary teachers used CMC more consistently, sharing lessons and exchanging e-mail messages. This is a phenomenon that has not been noted in earlier research on curriculum development in networked projects.

Sproull and Kiesler (1992) noted that those communicating electronically show less audience awareness. This may be true in certain circumstances. However, in the project under investigation, the teachers showed great audience awareness to the point of being hesitant to share their lessons. This may be related to the fact that the audience was known to the teachers, was not a general audience, and was made up of their peers.

The participants in the K-12 Education in Philanthropy Project contended that lack of time interfered with their ability to learn to use the computer systems and to work on lessons. Finding enough time to develop curriculum is important in traditional curriculum projects as well. Further findings of this study, supported by previous research,

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underscore the importance of time to frequency of use, and the effect of competing demands on participants.

An inconclusive finding of this research concerned the impact of local district administrative support on teachers' use of CMC. The project teachers described varying degrees of support from their building principals, yet with one glaring exception, this did not seem to have a direct effect on teachers' use of CMC. The district where this was a factor is a very large urban district with many competing demands and problems. In this district the lack of administrative support, revealed through an unmanageable bureaucracy, served to reduce the frequency of CMC for the teachers in the project.

A finding of this research that has relevance to projects involving teachers was also cited by Coulter and Feldman (1995). A number of the project teachers displayed a hesitancy to request technical assistance for their computers. This was evidenced in the K-12 Education in Philanthropy Project in two ways. First, the project director noted that a few of the teachers were uncomfortable asking students for help with their computers. Second, during the focus group interviews, some of the teachers indicated that they had not signed up for on-line computer courses (a potential help with computer use) because they did not think they would be able to figure out how to navigate the class. However, they did not ask for the assistance they needed, which was readily available to them. It is also possible that those teachers did not sign up for a computer class because they did not have time.

A final comment on the K-12 Education in Philanthropy Project deserves mention. As a multimillion-dollar endeavor, this project has been very well funded. National foundations such as the Kellogg Foundation and the Libby Foundation have provided

significant financial support for this curriculum development project. Millions of dollars are not typically available to a school system to use to develop a new curriculum or to invigorate an established curriculum. In the case of this project, major foundations and local community foundations have come forth to support a concept about which they hold strong beliefs.

In conclusion, CMC can be a useful tool in developing curriculum. CMC is not, however, a tool without baggage. It is a communication medium that is ripe for misunderstandings because communication occurs without the usual social cues that are present with face-to-face communication. Staff members must have access to computers in order to use CMC for curriculum development. Further, depending on the use of CMC for a curriculum development project may create problems if the participants are not skilled with computers. This can result in a cost for both training and time.

Yet CMC has the potential to change the face of traditional curriculum development by adding a bit of flexibility to the process. The opportunity to edit on-line can lessen the need for face-to-face interactions. In addition, time spent to gather or send lessons through either school or U.S. mail can be reduced. Certainly, CMC can diminish the problems associated with distance for a statewide project. Speed, flexibility, asynchronicity, on-line editing, and overcoming distance are the primary advantages for using CMC while developing curriculum.

The teachers who participated in the K-12 Education in Philanthropy Project indicated during the focus groups and in their journals that they now use computer technology in their teaching. Further benefits of program participation included professional development, intellectual challenge, and the opportunity to participate in a

state-wide initiative. Finally, the lessons developed for the project incorporate on-line resources that students can access. Ultimately, then, the students in classrooms will be the beneficiaries of a curriculum developed through the assistance of CMC.

Implications for Practice, Policy, and Research

There are interesting implications for practice, educational policy, and further research from this study on the impact of CMC on the curriculum development process. These implications are provided here by addressing Research Question 3:

What are the implications of this study?

This study on the impact of CMC on curriculum development has implications for the practice of curriculum development, for policy makers who provide leadership and direction for those practices, and for further research.

Implications for Practice

Research Question 3a: What are the implications of this study for practice?

From the findings of this study, several observations are offered here that have implications for school administrators, curriculum developers, teachers, and others interested in using CMC as a means of enhancing the outcomes of a curriculum development project. Figure 5.2 provides a list of recommendations that have implications for practice when using CMC for curriculum development.

When planning a project that relies on the use of CMC, it is important to *require a minimum level of computer competence* by project participants and leadership. This would include both skill and experience in using computer technology. If computer training is a component of the project, that training should be completed before the work

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of the project begins, and computers should be available for practice. A suggestion

offered by the project teachers and the computer support staff is to customize the training

by ability. If budgets and staffing allow, provide an opportunity for participants to meet

between training sessions individually with someone with computer expertise.

Implications for Practice
Require a minimum level of computer competence by project participants
Address mechanical and technical concerns before the project begins
Select dynamic and supportive project leadership that models the use of CMC
Provide opportunities for participants to meet face to face
Structure reasons to communicate using CMC into the project
Be sensitive to the culture of the participants
Acquire local administrative support for the project

Figure 5.2: Curriculum development in a project that relies on the use of CMC:
Implications for practice.

Address mechanical and technical concerns before the project begins. In this

regard the project director remarked, "Do not underestimate what it takes to get a system

up and running!" Determine in advance the adequacy of local technical support and

whether that support will be available to participants. Identify the security requirements to

reduce problems with theft or vandalism. Find out whether a district has a fire wall

installed that would interfere with electronic communications and web access. Make sure

computer equipment is uniform, or at the least can support the same software programs.

Select dynamic and supportive project leadership that models the use of CMC.

The project leadership sets the standard for all the work of the project. They also play an

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important role in encouraging project participants and ensuring commitment to the goals and objectives of the project. The leadership for the K-12 Education in Philanthropy Project provided excellent models as prolific computer users themselves, and they required that the participants communicate with them using CMC. In addition, they possessed strongly held beliefs about the goals of the project.

Provide opportunities for participants to meet face to face. Repeatedly, both staff and teachers pointed out the importance of face-to-face meetings for building an esprit de corps. Also, there are certain activities that just work better in small-group meetings–for example, brainstorming. Face-to-face meetings also serve to build relationships that can be continued through CMC.

Structure reasons to communicate using CMC into the project. An interesting phenomenon to the researcher was that a number of the teachers, particularly at the secondary level, indicated that they had not shared lessons or communications electronically with other teachers because "nobody told us to." This points out the importance of building in reasons to communicate and exchange information, as was required of the assessment subgroup. Provide clear, specific directions more than once. If a list serv or bulletin board is to be used, provide regular oversight and make it a priority to ensure that interesting topics are posted. Also, do not expect people who are inexperienced with computers to read and participate in on-line discussions in the initial phases of a project.

Be sensitive to the work culture of the participants. Every organization has its own cultural norms and activities. Because teachers generally work in isolation, take that into account if they are expected to work and behave in different ways from what they are

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used to. It may take some time for certain teachers to feel comfortable sharing their writings, editing the work of other teachers, or working with a group. Most teachers are achievers and, therefore, want to do assigned tasks well. In addition, in education there are certain times of the year that would be better–or worse–to have additional demands placed on teachers. The beginning of the school year, for example, is a busy time for teachers, so it is not a good time to add responsibilities to their already busy schedules.

Acquire local district administrative support for the project. It is important that building principals and local curriculum administrators understand and buy into the goals of the planned project for them to support the project. Part of this process must include a means of communicating that information to the appropriate administrators and giving them adequate time to discuss the project goals and to consider the project in relation to other district priorities. The building principal and superintendent also need to sign off on any grant or other agreement involving teachers. It is important to keep the administration informed regarding the project as it progresses. This will increase their understanding of and perhaps their support for the project.

Implications for Policy

Research Question 3b: What are the implications of this study for policy?

Implications can also be drawn from this study that have relevance to education policy. Because curriculum designs are more and more the result of decisions made at the national, state, and school system levels (Tanner & Tanner, 1980), it is important that policy makers are attuned to the issues important to the use of CMC in a networked project. McDonnell and Ellmore (1987) further suggested that policy can exert control of

curriculum through state and district requirements. The important implications for policy

that emanate from the findings in this study are detailed in Figure 5.3 and discussed in this

section.

Implications for Policy Makers
Examine computer security policies
Require appropriate use agreements
Hire teachers who are computer literate
Craft policies that support effective computer usage
Ensure that grant makers understand CMC project success factors

Figure 5.3: Curriculum development in a project that relies on the use of CMC:
             Implications for policy makers.

Examine computer security policies. Safety of students is the primary reason that

security policies exist. Sometimes security measures are taken with good intentions that

have unintended consequences. School districts have installed fire walls to protect

students from undesirable material available on the Internet. The fire walls can also

restrict desirable information and activities. Review the reason for the fire wall to

determine whether it is fulfilling its purpose, and whether the need for a fire wall remains.

(Certainly the answer to that question may be yes.) Also, a district needs to make sure

that there is adequate space for computer equipment and that the equipment is secure from

theft, vandalism, or hacking.

Require appropriate use agreements. Every school in the district with staff using

computers should have an appropriate use agreement signed by the staff. If a special

project were set up using computers and the Internet, the agreement would cover it.

However, if an outside organization oversees a special project, such as with the K-12 Education in Philanthropy Project, that project should also require that an appropriate use agreement be signed by each participant.

Hire teachers who are computer literate. This is currently not a uniform practice in all school districts. Although there is a perception that all young people are computer literate, this is not always the case. It becomes a serious time and money issue if districts have to provide computer training to teachers. Teachers who are competent computer users understand what an important educational tool computers can be–not only for teaching, but also for maintaining and improving their professional skills and knowledge. Certainly, if a district planned a curriculum project, having computer-literate teachers would be a benefit.

Craft policies that support effective computer usage. Policies can have an impact on how and whether teacher release time is available for special projects involving technology. Set up structures that ensure that beginning teachers have an experienced teacher as a computer mentor. Provide computer training during the summer so that teachers can focus on improving their skills without other distractions. Require that at least some of the curriculum work of the district be carried out electronically.

At the state and national levels, *it is important that grant makers understand those factors that contribute to the success of projects using CMC.* Certainly, grant readers should look for evidence in the application of the following:

1. A plan for ensuring technology access.

2. Adequate technical support.

3. Involvement of local district administration.

4. Security measures and appropriate use agreements.

5. Uniform equipment and software.

6. A plan for training that is realistic.

7. Strong leadership with demonstrated knowledge of the topic and computers.

8. Identified structure to ensure that CMC occurs.

9. Opportunities for face-to-face meetings.

10. A fit between the project time line and the school calendar.

Implications for Further Research

Research Question 3c: What are the implications of this study for further research?

This study revealed interesting areas for further research. Potential areas for inquiry are organized under the following categories: Educational Technology, Educational Leadership and Change, Technology and Communication, Curriculum, and Special-Interest Groups.

Educational technology. The teachers involved in this project all had access to computers that were purchased at considerable cost to the project. An interesting question could consider the impact of personal-computer ownership or access to developing curriculum in a networked project. On-line computer classes were offered free of charge to the project teachers. What are the differences, if any, between the teachers who took advantage of this opportunity and those who did not? An area of research that would be valuable to teachers could look at the kinds of web resources that are most helpful to teachers and, when researching information, the number of mouse clicks that can occur before a teacher loses interest in researching the topic.

Educational leadership and change. For this study, project leadership was provided from a source outside of the teachers' school districts. How would leadership issues vary for projects led from within? What impact would factors such as district position in the leadership hierarchy, overall district support for the curriculum project, or technology expertise of the district leadership have on the project? Other research might consider the effect that fear of disclosure has on projects involving CMC and effective techniques to assuage those fears.

Technology and communication. What effect does the number of participants have on CMC? As the number increases, does difficulty in communicating increase? Is there a grade-level influence on issues such as fear of disclosure or propensity for on-line collaboration? Another question worthy of research is whether CMC removes some of the personal issues that can arise during face-to-face communication. For example, in a typical group meeting there may be one person who dominates the conversation. Would that decrease during CMC? Further research could examine the discourse of the text in electronic communications to better understand the nature of voice and power in the exchanges.

Curriculum practices. An additional question could determine what strategies are successful for embedding a particular curriculum into an existing district curriculum. The K-12 Education in Philanthropy Curriculum will be shared through the World Wide Web. How effective is this as a mechanism for sharing the information, and would a school system adopt a curriculum that is available on-line and was developed by people outside the district? The impact that the project teachers have had on their respective school districts could prove interesting. Whether elementary teachers are more willing to share

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their lessons than secondary teachers under other conditions is another topic for a prospective study.

Special-interest groups. The K-12 Education in Philanthropy Project was designed and funded by a group of people with a special interest in developing a curriculum on the teaching of philanthropy and civic responsibility and its importance to a democratic way of life. This project was initiated from outside the educational arena through the Council of Michigan Foundations. A case study on the impact a special-interest group can have on the K-12 curriculum in public education would make a fascinating research project. In the case of the philanthropy curriculum, it would be interesting to determine the sustainability of the project.

APPENDICES

APPENDIX A

K-12 EDUCATION IN PHILANTHROPY PROJECT

K-12 Education in Philanthropy Project

Teaching the Importance of Voluntary Action for the
Public Good in a Democratic Society

Kindergarten Through Twelfth Grade (K-12) Education in
Philanthropy Case Statement Executive Summary

Each day leaders from emerging democracies come to the United States with a relatively surprising question. They want to know how they can create a third sector in their countries. They ask for guidance on teaching democratic and philanthropic principles to their children, and about systems for passing on the tradition of private citizens working for the common good. They come to the United States because they recognize that the third sector in America is fundamental to building and sustaining a secure democracy, supporting government, and to making our heterogeneous society function.

Their questions echo many of those posed by teachers and civic leaders in the United States: How do we engage children in civic life? How do we harness youthful idealism and combat growing cynicism? How do we teach caring about others, particularly those less fortunate? What is missing from our courses in government, history, economics, sociology, psychology, and philosophy that results in young adults without understanding or passion for the noble ideas of their society?

It is astonishing, but true: the United States has difficulty answering questions from emerging democratic nations because, until recently, the transmission of the philanthropic tradition from one generation to the next was informal, and so effective as to be transparent. There has never been a formal curriculum for teaching the facts or inculcating the values of the independent sector.

Teaching About the Third Sector in Schools

In this country, history is taught without serious attention to the role of volunteers in building the first black colleges or the role of private donors in funding the Salk vaccine for polio. Psychology and sociology, frequently focused on deviance, often do not explore the motivations and the relationships involved in setting aside self-interest for the benefit of the community.

When economics is taught, the curriculum frequently does not directly discuss the 13% of the economy represented in the activities of the third sector as it does the value of government and manufacturing. The teacher often does not address the 20 billion volunteer hours each year, which add value to the economy and promotes our common community interests. The role of the corporation as a integral part of the civic fabric, a citizen, is not discussed.

Education in civics often does not elaborate on the nonprofit sector as the source of new ideas that lead to social policy changes, or the third sector as the place that develops the skills that are needed for public discourse and democratic compromise. The relationships between social activism, a healthy democracy, and active engagement of citizens in government are seldom discussed.

School-to-work programs often ignore the opportunities for employment in the third sector found by nine million Americans, nearly one in eight workers in the United States.

We have relied in the past on churches, families, friends and neighborhoods to teach children the value and significance of service and giving. We have assumed that our children know their heritage as citizens who do not need to be "empowered" by an outside agency, but who are born empowered as their inherent right of citizenship. It is sadly ironic that today, as emerging foreign democracies seek our assistance in establishing philanthropic traditions of their own, the traditional forces for teaching this ethic to children in the United States are eroding.

The very skills and community cohesion necessary to offset forces of social disintegration, especially in an increasingly diverse culture, are skills and experiences found in the third sector. Yet an understanding of this sector remains a mystery to many American children.

Developing Lessons and Materials about Philanthropy

The Council of Michigan Foundations and a Steering Committee of thirteen collaborating leaders in education, volunteerism, and nonprofit leadership have begun a unique effort to write, field test, implement and disseminate high quality K-12 curriculum lessons, units and materials on philanthropy. The project is being nurtured and piloted in Michigan with plans for a national and international infusion of this academic content into the core curriculum of schools.

The long-term goal of the project is to develop and replicate curriculum lessons, units, and materials for perpetuating a civil society through the education of children about the independent sector, and to achieve their commitment to private citizen action for the public good. The lessons, units, and materials that are a part of the curriculum contain both academic content about philanthropy, and skill development activities which involve students in giving and serving their communities.

The basic strategy for the project is a grassroots teacher led effort to infuse academic content about philanthropy and service learning process into the curriculum. Forty-three teachers in twenty-two school systems serving a variety of communities in rural, suburban, and urban settings, are developing lessons, units, and materials, piloting, field-testing, and building authentic evaluation processes. The teachers are in kindergarten through senior high school classrooms, in public and private schools, from downtown Detroit to the Upper Peninsula.

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Once field-testing is completed, the modules and materials will be disseminated in a Website to be shared nationally and internationally without cost. During the process of writing and testing, national and international educators will be linked into the writing through the Internet, presentations at meetings, communications and informal networking.

This carefully designed nine-year program has started. Already it has generated an enthusiastic response from classroom teachers and school administrators. A request for proposals for curriculum development for the Michigan program resulted in essays from teachers that affirmed the need for such a curriculum.

"For a child to feel a sense of worth, he or she must feel that he belongs and that his existence is meaningful. And just as family provides the framework from which that sense of worth develops, the child's formal education should include an understanding of the rights and responsibilities of individuals to the greater whole of society."

– Fourth-Grade Suburban School Teacher

"What greater purpose does a middle school have than to help a child in transition find himself . . . have that powerful realization: someone needs me to help. We have a responsibility to provide opportunities that allow students to feel needed in the larger community so they don't develop a sense of self in a vacuum."

– Middle School Teacher

"We're living in a society where money has more power than God; where human life is worth less than someone's jacket. We must teach our children about tolerance, unselfishness, and about giving. We need to teach them that sometimes we need to compromise or give up something that would be good for us as an individual so that what we're choosing instead is good for all."

– High School Teacher

How The Project Is Being Developed And Implemented

The project is thoughtfully complex, with several strategies in each phase: development, assessment, piloting and field testing, content development, teaching process, evaluation, and dissemination. The major components are:

- A teacher based and grassroots effort which increases authenticity

- Quality curriculum infused into the core academic content courses

- Teaching both about philanthropy (academic content) and philanthropy (personal commitment)

- Utilization of computer technology for communication on many levels

- Access to all material by all educators without copyright concerns

- Local advisors with ties to state and national networks

- Colleges of education involvement

- Multiple dimensions, networks, and strategies for dissemination

- Multiple evaluation strategies and assessment

- Bias toward collaboration

The K-12 Education in Philanthropy Project is successfully launched and is moving rapidly to fulfill its potential in thoughtfully and systematically transmitting the philanthropic tradition to the next generation. Fur further information, please contact: Dr. Kathy Agard, Project Director, Kagard@remc4.k12.mi.us.

K-12 Education in Philanthropy Project
Teaching the Importance of Voluntary Action for the
Public Good in a Democratic Society

School Information

Teachers and Principals Participating in K-12 Education in Philanthropy Project

Forty-six teachers in twenty-two school systems serving a variety of communities in rural, suburban, and urban settings, have developed curriculum modules and materials. They were actively engaged in piloting, field-testing, and building authentic evaluation processes. The teachers are in kindergarten through senior high school classrooms, public and private schools, from downtown Detroit to the Upper Peninsula. They have infused philanthropy and the service learning process into academic content curriculum.

Building principals contributed by providing insight, suggestions, evaluation, and support. As the educational leaders in their districts, they have assisted the project throughout its development and implementation.

We invite you to share your experiences with other teachers in the **Teacher Bulletin Board** area. You may communicate with the teachers and principals by using their e-mail addresses. We look forward to your comments, web site additions, and your implementation of these teaching materials. Comments may also be directed to the **Webmaster** listed on the home page.

Teacher Biographies	Principal Biographies
Grades K-2	Elementary
Grades 3-5	Middle
Grades 6-8	High
Grades 9-12	

K-12 EDUCATION IN PHILANTHROPY PROJECT

Council of Michigan Foundations

"The Big Picture"

1997-2006

STAGE III

International Teaching of Philanthropy K-12
Integrated into the Schools' Core Curriculum
Beginning of Sustainable Organizational Structure
(1999-2006)

STAGE II
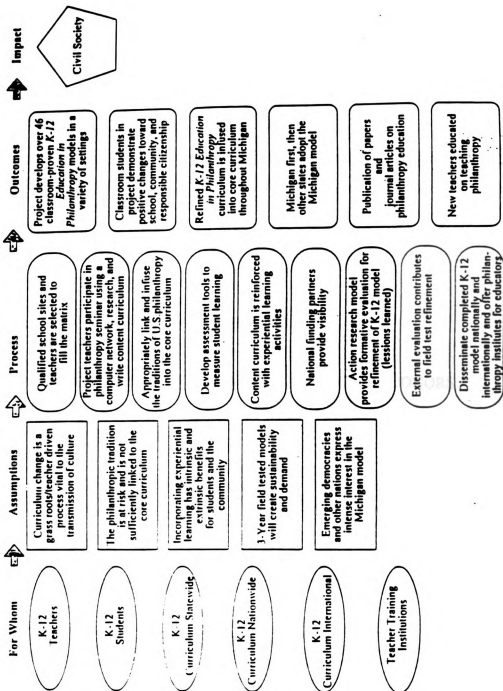
United States Teaching of Philanthropy K-12
Integrated into the Schools' Core Curriculum
Beginning of a National Organizational Structure
(1998-2003)

STAGE I

State of Michigan Pilot Development of Lessons and Units
Web Site Initial Development
Field Testing for Universality and Quality Assurance
Integrate into the Core School Curriculum the Teaching of Philanthropy K-12
(1997-2000)

K-12 Education in Philanthropy Project
Logic Model

For Whom	Assumptions	Process	Outcomes	Impact

For Whom:
- K-12 Teachers
- K-12 Students
- K-12 Curriculum Statewide
- K-12 Curriculum Nationwide
- K-12 Curriculum International
- Teacher Training Institutions

Assumptions:
- Curriculum change is a grass roots/teacher-driven process vital to the transmission of culture
- The philanthropic tradition is at risk and is not sufficiently linked to the core curriculum
- Incorporating experiential learning has intrinsic and extrinsic benefits for students and the community
- 3-Year field tested models will create sustainability and demand
- Emerging democracies and other nations express intense interest in the Michigan model

Process:
- Qualified school sites and teachers are selected to fill the matrix
- Project teachers participate in philanthropy seminar using a computer network, research, and write content curriculum
- Appropriately link and infuse the traditions of U.S. philanthropy into the core curriculum
- Develop assessment tools to measure student learning
- Content curriculum is reinforced with experiential learning activities
- National funding partners provide visibility
- Action research model provides formative evaluation for refinement of K-12 model (lessons learned)
- External evaluation contributes to field test refinement
- Disseminate completed K-12 model nationally and internationally and offer philanthropy Institutes for educators

Outcomes:
- Project develops over 46 classroom-proven *K-12 Education in Philanthropy* models in a variety of settings
- Classroom students in project demonstrate positive changes toward school, community, and responsible citizenship
- Refined *K-12 Education in Philanthropy* curriculum is infused into core curriculum throughout Michigan
- Michigan first, then other states adopt the Michigan model
- Publication of papers and journal articles on philanthropy education
- New teachers educated on teaching philanthropy

Impact:
- Civil Society

APPENDIX B

K-12 EDUCATION IN PHILANTHROPY PROJECT DONORS

K-12 Education in Philanthropy Project Donors

Lilly Endowment	$300,000	1997-1999
	$500,000	1000-2001
W. K. Kellogg Foundation	$1,500,000	1997-2000
	$1,500,000	2000-2003
Anonymous donor	$600,000	1999-2000
McGregor Fund	$150,000	1999-2001
Ewing Marion Kauffman	$75,000	1999-2000
Sudna Foundation	$25,000	1997-1998
Michigan Dept. of Education	$62,500	1999
(contracts)	$52,500	1999-2000
Local community foundations		
Kalamazoo (in kind)	$8,000	1997
Muskegon	$2,000	1997
Manistee	$2,000	1997
Earl-Beth Foundation	$5,000	1995
Mawby Fund of CMF	$25,000	1997
Binda Foundation	$40,000	1999-2000

In-kind donations from the following:

Kettering Foundation
Grand Valley State University
Indiana University Center on Philanthropy
Muskegon Area Intermediate School District
National Board for Professional Teaching Standards

APPENDIX C

FORMS SUBMITTED TO THE UNIVERSITY COMMITTEE

ON RESEARCH INVOLVING HUMAN SUBJECTS (UCRIHS)

APPLICATION FOR APPROVAL OF A PROJECT INVOLVING HUMAN SUBJECTS
INITIAL REVIEW (and 5 yr. renewal)
UCRIHS
University Committee on Research Involving Human Subjects
David E. Wright, Ph.D., Chair
246 Administration Building   Michigan State University
East Lansing, MI 48824-1046
PHONE (517) 355-2180   FAX (517) 353-2976
E-Mail - UCRIHS@pilot.msu.edu
WEB SITE - http://www.msu.edu/unit/vprgs/ucrihs/

Office Hours: M-F (8:00 A.M.-Noon & 1:00-5:00 P.M.)

DIRECTIONS: Please complete the questions on this application using the instructions and definitions found on the attached sheets. (revised 1/99)

---

1. Responsible Project Investigator
(Faculty or staff supervisor)
Name: _____ Dr. Maenette Benham ___
Social Security #: _____

Additional Investigator(s)

Name: Susan W. Meston _____
SS or Stu. ID#: 381-46-3365

Department: _Education Administration_
College: _____Education_____
I believe the research can be safely completed without endangering human subjects. Further, I have read the enclosed proposal and I am willing to supervise any student investigators.

Name: _____
SS or Stu. ID#: _____

Name: _____
SS or Stu. ID#: _____

Name: _____
Signature: _____
SS or Stu. ID#: _____

2. Address: If there are more than two investigators, please indicate who should receive correspondence, and provide further addresses on a separate page.

Responsible Project Investigator
Dr. Maenette Benham _____
425 Erickson Hall _____
East Lansing, MI 48823-1807 _____

Additional Investigator(s)
Susan W. Meston _____
18076 Hickory Street _____
Spring Lake, MI 49456 _____

Phone #: _(517) 355-6613 _____
Fax #: _____
E-mail: mbenham@pilot.msu.edu _____

Phone #: (616) 767-7203 _____
Fax #: __(616) 773.3498 _____
E-mail: ⌷⌷⌷⌷⌷⌷⌷ ⌷ ⌷⌷⌷⌷

3.Title of Project: ___The Impact of Computer Mediated Communication on _____
_____Curriculum Development _____
_____

FOR OFFICE USE ONLY
Subcommittee _____   Agenda _____

4. Have you ever received Preliminary Approval for this project?
    No [X] Yes [ ]
    If yes, what IRB # was assigned to it? _____

5. Funding (if any) __no_____
    MSU Contracts and Grants app. # _____ if applicable

6. Does this project utilize an Investigational Drug, Device or Procedure?
    No [X]   Yes [ ]
    If yes, is there an IND #? No [ ] Yes [ ] IND # _____

7. Does this project involve the use of Materials of Human Origin (e.g., human
    blood or tissue)?
    No [X]   Yes [ ]

8. When would you prefer to begin data collection? _March 15, 1999_
    Please remember you may not begin data collection without UCRIHS
    approval.

9. Category (Circle A, B or C below. See instructions pp. 5, 6 & 7)

    ⓐ. This proposal is submitted as EXEMPT from full review.
              Specify category or categories. _1-A, 1-C, 1-E_
    b.   This proposal is submitted for EXPEDITED review.
              Specify category or categories. _____
    c.   This proposal is submitted for FULL sub-committee review.

10. Is this a full review multi-site project?   No [X] Yes [ ]
    If yes, do the other sites have a Multiple Project Assurance IRB that will also
    review this project?
    [ ] No. Please contact the UCRIHS office for further information about meeting
    the PHS/NIH/OPPR regulations.
    [ ] Yes. Please supply a copy of that approval letter when obtained.

11. Project Description (Abstract):   Please limit your response to 200 words.

    The Project Description (Abstract) is attached.

12. Procedures: Please describe all project activities to be used in collecting data from human subjects. This also includes procedures for collecting materials of human origin and analysis of existing data originally collected from human subjects.

1. The researcher will hold three focus groups of 1½ hours in length with eight of the project teachers in each group. The researcher and a transcriber will be present during the focus group interviews. In addition, a tape recorder will be used to record the contents of the interviews.

2. The researcher will hold individual interviews with the 5 project support staff. The interviews will be recorded using a tape recorder.

3. The researcher will review existing archival data associated with the project to identify themes and to use in triangulating all data sources.

13. Subject Population: Describe your subject population. (e.g., high school athletes, women over 50 w/breast cancer, small business owners)

44 practicing K-12 classroom teachers and 5 project support staff

a. The study population may include (check each category where subjects may be included by design or incidentally):

Minors	[ ]
Pregnant Women	[X]
Women of Childbearing Age	[X]
Institutionalized Persons	[ ]
Students	[ ]
Low Income Persons	[ ]
Minorities	[X]
Incompetent Persons (or those with diminished capacity)	[ ]

b. Number of subjects (including controls) _____49_____

c. How will the subjects be recruited? (Attach appropriate number of copies of recruiting advertisement, if any. See p. 13 of UCRIHS instructions)

No advertisement. Subjects part of an existing project.

d.   If you are associated with the subjects (e.g., they are your students, employees, patients), please explain the nature of the association.

No direct association

e.   If someone will receive payment for recruiting the subjects please explain the amount of payment, who pays it and who receives it.

No payment involved

f.   Will the research subjects be compensated? [X] No [ ] Yes.
If yes, details concerning payment, including the amount and schedule of payments, must be explained in the informed consent.

g.   Will the subjects incur additional financial costs as a result of their participation in this study? [X] No [ ] Yes. If yes, please include an explanation in the informed consent.

h.   Will this research be conducted with subjects who reside in another country or live in a cultural context different from mainstream US society? [X] No [ ] Yes.

    (1)   If yes, will there be any corresponding complications in your ability to minimize risks to subjects, maintain their confidentiality and/or assure their right to voluntary informed consent as individuals? [ ] No [ ] Yes.

    (2)   If your answer to h-1 is yes, what are these complications and how will you resolve them?

14.   How will the subjects' privacy be protected? (See Instructions p. 8.)

The researcher will adhere to a strict stand of confidentiality for all data collected from the project participants. During the focus group interviews the participants will be assigned a pseudonym. All taped recordings and scripts will be kept by the researcher alone and stored in a secure place. Information from the staff interviews will be presented in aggregate form wherever possible. However, the individual staff will be informed before the interviews that because of the unique nature of their positions, it may be possible to associate them with a particular perspective in the final product.

15. **Risks and Benefits** for subjects: (See Instructions p. 9.)

Potential risk to the practicing teachers would be loss of approval from the other participants or the project director (if informed by a focus group participant) if comments are made that reflect negatively on the project. The teachers are not employed by the project director and are involved in the project voluntarily. Interviewed project staff could face the risk of disapproval or the reprisal from the project director for comments that reflect negatively on the project.

Assigning pseudonyms to the focus group participants and informing both the focus group and individual staff members how the information will be used could reduce risk to the participants. Also, the researcher will adhere to a strict standard of confidentiality. The researcher will also verbally discuss risk potential - as it relates to staff and participants - with the project director. These efforts should put the participants at minimal risk. Additionally, all interviews will be voluntary.

Through the interviews the subjects will have the chance to discuss their work, and in the focus groups, consider their work and its ramifications with colleagues. The interviews provide an opportunity for introspection and for recognition. Since there is no significant body of research on using computer mediated communication in curriculum development, lessons learned from this research will be of significance to theory and practice.

16. Consent Procedures (See Instructions pp. 9-13.)

Written consent for participation in the individual interviews and focus group interviews will be obtained. This consent form will be included with the letter requesting participation in the interview.

Copies of letters and consent forms attached.

CHECKLIST: Check off that you have included each of these items. If not applicable, state N/A:

[ ]   Completed application

[ ]   The correct number of copies of the application and instruments, according to the category of review (See instructions p. 14.)

[ ]   Consent form (or script for verbal consent), if applicable

[ ]   Advertisement, if applicable

[ ]   One complete copy of the methods chapter of the research proposal

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MICHIGAN STATE
U N I V E R S I T Y

March 15, 1999

TO: Dr.Maenette BENHAM

    425 Enckson Hall

    MSU

RE: IRB# 99152 CATEGORY: 1-A,C,E

APPROVAL DATE:March 15, 1999

TITLE:THE IMPACT OF COMPUTER MEDIATED COMMUNICATION ON
      CURRICULUM DEVELOPMENT

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete and I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the **UCRIHS approved this project.**

RENEWALS: UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Projects continuing beyond one year must be renewed with the green renewal form. A maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for a complete review.

REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB# and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.

PROBLEMS/CHANGES: Should either of the following arise during the course of the work, notify UCRIHS promptly: 1) problems (unexpected side effects, complaints, etc.) involving human subjects or 2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of further assistance, please contact us at 517 355-2180 or via email: UCRIHS@pilot.msu.edu. Please note that all UCRIHS forms are located on the web: http://www.msu.edu/unit/vprgs/UCRIHS/

Sincerely,

David E. Wright, Ph. D
UCRIHS Chair

DEW: ah

cc: Susan Meston

APPENDIX D

FOCUS GROUP DOCUMENTS

Focus Group Interview Protocol
Interview Script

Interviewer: Hello. My name is Susan Meston. Thank you for taking the time to

participate in this focus group interview. As you know I am researching the impact of

computer mediated communication – electronic communication using computers – on

curriculum development. This research is being conducted for my dissertation study on

that topic through Michigan State University. My assistant today is Kristen Meston, who

is a speech and language pathologist. Kristen will take notes as you make comments. In

addition, I will record the proceedings of this focus group. Your comments are

confidential, and I have given you pseudonyms to further ensure confidentiality. If at any

time you feel uncomfortable with the recorder, you may request to have it turned off. I

have no vested interest in the content of your remarks. This focus group is being held to

gather your true feelings, thoughts and ideas, so there are no right or wrong answers, even

if you may disagree with one another. In the next hour and a half I will ask you questions

relevant to the K-12 Education in Philanthropy Project that concern the impact of CMC

on curriculum development. Please carefully consider the questions asked and provide

thoughtful answers. Do you have any questions before we begin?

Focus Group Interview Questions

Icebreaker: Tell us where you teach and what you like to do when you are not teaching.

1. Think back to when you first started using electronic communication. For what purposes did you first use it? How do you use electronic communication now?

2. How often do you use electronic communication for the project? What impacts the frequency of use?

3. How is computer-mediated communication different from other forms of communication? How has it effected your other modes of communication?

4. What effect did computer training have on your use of the computer for communication?

5. What helped and what has deterred you from using electronic communication for curriculum development?

6. What are the advantages of using electronic communication in developing curriculum? What are the disadvantages?

7. What role did computer mediated communication play in building a sense of collaboration with other project members?

8. If you were asked for advice on how to use electronic communication in developing curriculum, what suggestions would you offer?

At this point the moderator will summarize participant responses, then ask:

What haven't I asked you that is important to a project using electronic communication in curriculum design?

Letter to Participants of Focus Group Interview

April 12, 1999

Dear (Participant's Name),

This letter is written to invite you to participate in a focus group interview that will take place during the May 1999 K-12 Education in Philanthropy Project meeting at Crystal Mountain. The purpose of the focus group interview is to consider various aspects of the curriculum development process that you have experienced as a part of the K-12 Project. I will be running three focus groups: Group I for grade levels K-5; Group II for grade levels 6-8; and Group III for grade levels 9-12.

These focus group interviews will last about 1½ hours and will serve as one data source for my dissertation study through Michigan State University. The focus group interviews will be taped and transcribed by my assistant. Your participation will be very valuable because your perspectives as a project participant are important in understanding the benefits and the problems associated with curriculum development by electronically connected, geographically dispersed teachers. I will be using an ethnographic approach to my study, which means that I will consider my research questions from the perspectives of project participants.

I want to assure you that I will treat this research with the utmost confidentiality. You will be assigned a pseudonym to further assure confidentiality. Your identity will be known only to me, my assistant, and to a very limited group of people who work with me as my dissertation committee. Identifying information, including names, program affiliations, or other descriptors will be altered, masked, or altogether removed in final research reports. Kathy Agard, K-12 Education in Philanthropy Project director, and I have discussed that there will be no direct positive or negative consequences due to your participation or non-participation as far as the project is concerned. However, you may find the experience valuable because you will have the chance to consider - with a group of your colleagues - various factors important to this project.

If you have questions or concerns regarding this research, you my contact my dissertation committee chair, Dr. Maenette Benham, at (517) 351-9438. You may also contact the Chair of the University Committee on Research Involving Human Subjects (UCRIHS), Dr. David Wright at (517) 355-2180, if you have questions regarding rights as human subjects of research.

Attached is a consent form that indicates your interest in participation in one of the focus groups. Please complete it and return it to me by April 26, 1999. Thank you for your consideration. I will e-mail you within the next two weeks to schedule a good time

for me to call you to discuss this project further, including your interest in participating in a focus group. If you would like to contact me before that time, please feel free to call or email; I will be happy to respond to any questions you have.

Sincerely,

Susan W. Meston
18076 Hickory Street
Spring Lake, MI 49456
smeston@remc4.k12.mi.us
Phone #: (616) 767-7203

Consent Form

Focus Group Interviews

I agree to participate in the research project, "The Impact of Computer Mediated Communication on Curriculum Design". I have received and read the invitation letter form Susan Meston dated, April 12, 1999, which summarizes the purposes and procedures of this research and which includes her address and telephone number in case I have any questions or concerns about the study that I may wish to discuss with her. I understand that my participation in this research entails one focus group interview which will take place during the K-12 Education in Philanthropy meeting at Crystal Mountain Resort on May 15, 1999, and will last approximately 1 ½ hours. I have been informed and understand that all interview and documentary data will be treated with strict confidence and that my identity will not be disclosed in final reports of the study. I understand that my participation in this research is completely free and voluntary, and that I may choose not to participate at all, that I may refuse to respond to certain questions and that I may discontinue my involvement at any time without penalty or loss of benefits to which I am otherwise entitled.

_____   _____

Name   Date

APPENDIX E

INDIVIDUAL INTERVIEW DOCUMENTS

Staff Interview Protocol
Interview Script

Interviewer: Hello, again. (Introductions will not be made since the interviewer and interviewees have met.) Thank you for taking the time to participate in this interview. As you know I am researching the impact of computer mediated communication on curriculum development, research that is being conducted for my dissertation study through Michigan State University. Your perspectives are very important to my research. I have no vested interest in your remarks, so there are no particular answers I am seeking. I am interested in your true thoughts, ideas, and feelings. Anonymity cannot be guaranteed because of the small number being interviewed and the clearly different roles held by those being interviewed. However, your comments will be held to a strict standard of confidentiality. In the next two hours I will ask you questions relevant to the K-12 Education in Philanthropy Project that concern the impact of CMC in curriculum development. Our interview will be recorded. If at any point you would like me to turn off the recorder, this will be done. Do you have any questions before we begin?

Staff Interview Questions

1. In what ways do the teachers use electronic communication?

2. How has electronic communication affected other forms of communication by the teachers?

3. In what ways has staff used electronic communication to support the project teachers?

4. What effect has the technical training had on teacher use of electronic communication?

5. What challenges have the teachers faced in using electronic communication as a tool for developing curriculum, and how have they overcome these challenges?

6. What helps and what deters teachers from using electronic communication in curriculum development?

7. What technical support was necessary? Was it sufficient? Why or why not?

8. From a staff/support perspective, what have been the advantages and disadvantages of using electronic communications in developing curriculum?

9. How have organizational support factors such as project leadership, financial incentives, and training affected the use of CMC in designing curriculum?

10. What role did time and access play in the use of electronic communications for curriculum design?

11. What role did CMC play in teacher collaboration and consensus building?

12. What implications can be drawn from this process--the use of CMC in curriculum design--that could inform practice, policy, and for further study?

13. What haven't I asked you that is important to a project using CMC in curriculum design?

Susan Meston
18076 Hickory Street
Spring Lake, Michigan 49456

March 30, 1999

Dear Terry,

As part of the research for my dissertation through Michigan State University on the impact of computer mediated communication on curriculum development, I am asking staff and consultants close to the K-12 Education in Philanthropy Project to participate in an individual interview. The purpose of the interview is to consider various aspects of the curriculum development process, particularly the effect of electronic communication on that process. The interview will last approximately two hours, and will be taped by means of a tape recorder.

Your participation in an interview will be valuable to my research because you have a unique perspective on the project as well as on the benefits and the problems associated with curriculum development by electronically connected, geographically dispersed project members. I will be using an ethnographic approach to my study, which will allow me to consider my research questions from the perspectives of the project participants.

I want to assure you that I will treat this research with the utmost confidentiality. Identifying information, including names, program affiliations, and other descriptors, will be altered, masked, or removed in final chapter reports. Further, information will be reported in the aggregate wherever possible. However, because of your unique position with the project, anonymity cannot be assured. Kathy Agard, project director, and I have discussed that there will be no direct positive or negative consequences due to your participation or nonparticipation as far as the project is concerned.

If you have questions or concerns regarding this research, you may contact my dissertation committee chair, Dr. Maenette Benham, at (517) 351-9438. You may also contact the Chair of the University Committee on Research Involving Human Subjects (UCRIHS), Dr. David Wright at (517) 355-2180, if you have questions regarding rights as human subjects of research.

I will call you within the next two weeks to discuss my project further and to set up a time for our interview if you are interested in participating. If you would like to contact me before that time, please feel free to call or email. I will be happy to respond to any questions you have. Attached is a consent form that indicates your interest in participation in an individual interview. I will ask for it on the day of our scheduled interview. Thank you for your consideration.

Sincerely,

Susan W. Meston
Phone: (616) 767-7204
smeston@remc4.k12.mi.us

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Consent Form
Individual Staff Interviews

I agree to participate in the research project, "The Impact of Computer Mediated Communication on Curriculum Design." I have received and read the invitation letter form Susan Meston dated March 30, 1999, which summarizes the purposes and procedures of this research and which includes her address and telephone number in case I have any questions or concerns about the study that I may wish to discuss with her. I understand that my participation in this research entails one individual interview which will take place during the spring of 1999 and will last approximately two hours. I have been informed and understand that all interview and documentary data will be treated with strict confidence and that my identity will not be disclosed in final reports of the study. I understand that my participation in this research is completely free and voluntary, and that I may choose not to participate at all, that I may refuse to respond to certain questions, or to provide any of the requested documents, and that I may discontinue my involvement at any time without penalty or loss of benefits to which I am otherwise entitled.

_____   _____

Name   Date

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