PROFESSIONAL ISOLATION AND CONNECTION

AMONG HIGH SCHOOL SCIENCE TEACHERS

IN UPSTATE NEW YORK

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Robert H. Abrams Jr.

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PROFESSIONAL ISOLATION AND CONNECTION AMONG HIGH SCHOOL SCIENCE TEACHERS IN UPSTATE NEW YORK

Robert H. Abrams Jr., Ph.D.

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Where does Professional Isolation and Connection come from, are there differences in how different teachers experience it, how do teachers get from isolation to connection, and are there reasons to not want to make the trip? Previous research in this area explored the relationship between professional isolation and autonomy, but had not considered what education might look like if professional isolation were replaced with its opposite.

This study used a written survey which gathered representative data from a broad geographical region. This strategy was employed so that the results would not be influenced by any one teacher enhancement program. The survey was designed to embody features of clinical interviews. Such features include short answer questions derived from the experience of practicing teachers, and open-ended questions which probe specific responses in the short answer questions.

This study found that "Lack of Time" was the most frequently cited source of professional isolation, and "Friendship" was the most frequently cited source of professional connection. Unexpectedly infrequent sources include "Layout of instructional space" as a source of isolation, and "Computer networks" as a source of connection. Teachers have relationships with

other teachers which are primarily characterized by connection, although there is room for improvement. Productive relationships at the state level are higher than expected and probably reflect the efforts of statewide organizations, and conversely there is a gap in the number of teachers reporting productive relationships with other teachers who work in other parts of their county.

It is suggested that schools avoid policies that make it difficult to have friendships, encourage teachers to go to state conferences and provide facilitated follow-up, encourage county-based organizations to develop opportunities for teachers to utilize each other as sources of assistance, capitalize on the prevalence of productive relationships in teachers' own schools by explicitly linking such intra-school communities with one or more inter-school communities, and budget time for teachers to connect with each other. Finally, teachers should not only be encouraged to seek and give each other assistance, but should be thought of as scholars as well as teachers and be paid accordingly.

BIOGRAPHICAL SKETCH

Robert H. Abrams Jr. was born in New York City on June 16, 1967. He graduated Cum Laude from Trinity School in 1985. He received a Bachelor of Arts in Human Biology from Stanford University in 1990. He graduated from Cornell University with a Master of Science from the Field of Education in 1995. He completed his formal studies upon earning a Doctor of Philosophy from Cornell University in 1997.

To

Judith Winters Abrams
My mother, my first teacher, ever an example to follow.

How many blessings has our Mother given us?

If she had given birth to us,
And had not been fair in her judgements of us,
It would have been enough.

If she had been fair in her judgements,
And had not kept a home we could rely on for 18 years and more,
It would have been enough.

If she had kept a home we could rely on,
And had not fed us with banana bread,
It would have been enough.

If she had fed us with banana bread,
And had not driven us to countless activities,
It would have been enough.

If she had driven us to countless activities,
And had not let us walk our own path,
It would have been enough.

If she had let us walk our own path,
And had not set an example with her generosity,
It would have been enough.

If she had set an example with her generosity,
And had not taught us to value education,
It would have been enough.

Our Mother has showered blessings on us,
More than we can count.

She gave birth to us,
And was fair in her judgements.

She kept a home we could rely on,
And fed us with banana bread.

She drove us to countless activities,
And let us walk our own path.

She set an example with her generosity,
And taught us to value education.

She has brought us to today,
So that we might carry on her work, each in our own way.

ACKNOWLEDGEMENTS

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Chapter 1 - Introduction

Personal Experience with Education

Why do people decide to learn? Why do people decide to teach?

Answers to these questions should help the reader understand research in general, and my answers to these questions should help the reader to understand the research that will be presented in this dissertation.

I come from a culture whose identity has been intimately connected to education for thousands of years. I attended a school founded when New York was still a colony. I come from a family that values education. I was a student with inspirational teachers at many levels from second grade on. And, no doubt, I had some innate drive which allowed me to follow these examples.

I decided to become an educator for reasons that I can identify more specifically. From the fifth grade through high school, I was involved in independent motion picture production at the school I attended. During my senior year, my school required all graduating students to pursue an extensive project, instead of the last month of classes. The year that I became a senior, the school required that a portion of this project be public service. A friend of mine and I convinced the faculty advisor to stretch the definition of public service and allow us to teach a filmmaking class for the 5th and 6th grades - the class in which we both had gotten our start, but which was no longer offered due to the lack of an interested teacher to teach such an elective. I discovered that I enjoyed teaching because I wanted

others to have the chance to experience something I loved. I enjoyed it enough that I spent a semester during a year off before college teaching three classes of motion picture production at the school from which I graduated. Even after having spent five years in graduate school in education, I still find it satisfyingly ironic that there are people who fulfilled their high school art requirement by taking a course from me.

The other specific teaching experience came my senior year in college. Stanford had a program where an undergraduate with specialized knowledge could propose and teach a course carrying university credit. I taught a course based upon my honors thesis research. While there are certainly many things I would do differently were I to teach this course again, it was very satisfying to find that I had something to offer that others found worth discussing.

In both experiences, I found that my knowledge, of what I already knew quite well, improved because I was forced to organize my knowledge in order to present it to others.

I decided to pursue a PhD in large part because I found something on my university campus that I had found nowhere else: a community where intellectual discussion was possible.

As I discovered during graduate school, universities are not the only places where discussion is possible. Through a succession of accidents, I became heavily involved in the GreenStar Cooperative Market. The first accident was an act of G-d (an earthquake), and the second may have been a failure of the educational system (a fire set by a 13 year old). GreenStar is the

largest cooperatively run, natural foods supermarket in upstate New York. It is the kind of place where people care about food and take the time to discuss its relationship to the rest of their lives.

It was with this background that I encountered the work of TERC's Labnet project. This on-line community of practice had existed for several years and had over 1000 members. They had found a rather paradoxical phenomenon that many of their teachers felt a greater sense of community with the other teachers on-line, teachers who were distributed across the United States, than they did with teachers in their own schools. My readings led me to the work of Feldman who had commented on the importance of teachers offering each other assistance the way that people in other professions do. (Feldman, 1994) From my reading of the literature in several topic areas, and from discussions with practicing teachers, it was becoming apparent that teachers often feel isolated from each other. After much searching, I finally had a concept that was researchable and was in line with my interests.

Educational Theory which Informs this Dissertation

One of Piaget's most important contributions to educational psychology was the observation that people's abilities develop in age related stages. (Piaget, 1974, p. 89) Ausubel refined this observation by discovering that the stage of development which a person displays is less rigidly correlated with age than Piaget thought. (Ausubel, Novak & Hanesian, 1978, p. 224) To be fair, it should be kept in mind that authors who have made substantial contributions tend to get turned into heraldic emblems of themselves. Just

as an heraldic animal, such as a lion, can not be thought of as a direct representation of the real animal it represents (Rothery, 1915), the condensed common understanding of an author's work can not be understood as the complete picture of that author's work. In the case of Piaget, some of his work acknowledges more age variability in the attainment of developmental stages (Piaget, 1972, p. 50) than other examples of his work. Ausubel observed that a person's stage of development could vary by domain. (Ausubel et al., 1978, p. 225-227) For example, a ten year old could be capable of formal reasoning in the domain of chess, but could have less developed powers of reasoning in the domains of marine biology or social dynamics. The work of Novak has shown that a person's stage of development in a domain is related to both the number of concepts and the number of links between concepts that a person has learned in that domain. (Novak, 1977)

   Ausubel suggested that the best way to teach is to determine what the learner already knows and teach from there. (Ausubel et al., 1978) This suggests that teaching can be most effective when links are made between new concepts presented in the curriculum and concepts already in each student's conceptual framework.

   A theory of teaching and learning would be incomplete without a role for the teacher. Vygotsky provided theory which puts forth an active role for the teacher. Through his "Zone of Proximal Development", he suggested that there are tasks which students can perform on their own, tasks which the student can perform with assistance, and tasks which the student can not perform even with assistance. (van der Veer & Valsiner, 1991, p. 336)

Thus, the role of a teacher becomes that of a coach, who responds to the
needs of each student (as suggested by Ausubel) to help each student gain
mastery (or, to use Piaget's terms, attain higher stages of development) in a
specific domain.

If one works out the implications of this theory, it can be seen that the job
of a teacher is no easy task. The teacher must have sufficient mastery of a
domain to be able to create a strong connection between that domain and
the prior knowledge of many different students. Since the state of the art
evolves in nearly every domain, the teacher should strive to expand his or
her understanding in that domain. Furthermore, since the needs and
backgrounds of students change over time, such as due to changing
demographics, the teacher needs ever developing skills to be a successful
coach for each group of students.

Who is the teacher's coach? In the conventional image of teaching, the
teacher's classroom is his or her exclusive realm. The teacher expects to
have autonomy over what happens in that classroom. Trial and error
learning is all the development that is needed. It should be clear both from
the theory and from common experience that this approach leaves teachers
less prepared than they might be. Through reading the literature and
consulting with practicing teachers, I obtained the sense that the way
teachers do or do not give and seek assistance from other teachers and other
types of professionals was far more complex than this conventional image
of teaching would suggest.

In many disciplines of social science, and especially in education, there is a tension between theory developed by researchers who observe phenomena from a distance, and the perspectives of practitioners who are in the middle of things. The theory which informs this dissertation includes the premise that researchers and teachers can learn from each other. This learning should start by respecting each other, which in a way is just an attempt by both parties to share their respective prior knowledge. This premise has been implemented in both the work on exemplary teacher research, and professional development schools, which are reviewed in Chapter 2. By the same token, this research was an attempt to apply my own theoretical framework and prior experience to the synthesis of many different teachers' experiences on a topic of mutual interest. It is my hope that this synthesis will be useful to teachers.

The gap in the literature

What literature I could find on professional isolation itself had several problems. First, many of the studies found professional isolation while researching something else, often a specific method of peer observation or evaluation. Second, the studies found professional isolation due to a variety of causes. Third, the studies were almost all in-depth, small sample studies. Finally and most importantly, all of the studies presented professional isolation paired with autonomy. According to the prevailing argument, professional isolation may have negative consequences, but it also results in teacher autonomy to make decisions in the classroom (because if teachers are isolated, administrators and other teachers don't

bother or impose upon the teacher). There was no concerted effort to imagine what would exist if the isolation were replaced with its opposite.

Nature of the inquiry

This study was conducted in a large geographic, functional region of upstate New York. A large geographic region was chosen so that the results would not reflect the influence of any one teacher development program. A functional region was chosen to define the boundaries for the geographic region on the theory that the regions through which education is administered would likely be the regions through which results from the study might be used. This is in contrast to political regions, such as counties, which do not have an exact alignment to groupings of school districts. For the purpose of this study, four contiguous BOCES regions were chosen to define the region under study. BOCES, or Boards of Cooperative Educational Services, are cooperatives formed by groups of school districts to provide teacher development and community education services that school districts could not afford on their own.

I decided to survey high school science teachers since Dr. Novak's research group had often worked with such teachers in the past. This gave me better access to teachers in some of the schools, as well as providing a good conceptual tie-in to the previous work of the research group. I needed to limit the number of teachers participating per school so that I could survey a large geographic region. Choosing one department enabled me to work

with one organizational structure within each school, and made it more likely to be able to find a time to meet with the teachers in person.

A four page written survey was sent to all high school science teachers in the region. The final version of the survey contained several sets of short answer, quantitative questions, as well as several open-ended, qualitative questions which followed up on the answers in the short-answer questions.

The evolution of the study

An initial version of the survey was developed by looking for sources of professional isolation in the literature, and by talking to practicing teachers about possible sources, as well as to obtain confirmation that this study would be valuable to their work. The teachers involved with CIRBM (Cornell Institute for Regional Biology Mentors) were especially helpful in this regard. This initial survey was sent to the teachers of one region of the California High School Network Project. Based upon the responses from this group of teachers, the survey and especially the response rate strategy was modified. The revised survey was examined at the public discussion for this study. A revised version of the survey was given to a cohort of Cornell teacher education students. The survey was examined at a meeting of the study's collaborative partners group, which was attended by two high school principals. Minor changes were made to the survey, which was then sent out to the participating teachers.

Organization of data

The results for the quantitative questions on the survey were entered into SPSS. Open ended results were entered into a Filemaker database. SPSS allowed a variety of exploratory and computational analyses to be performed on the quantitative data. This included the use of the demographic data to see if there were significant differences or similarities between subgroups of teachers by gender, highest educational level attained, and teachers' years of full time experience. Statistical consultants were consulted to determine the appropriate statistical tests. The kind of discontinuous data collected by this study is best analysed using non-parametric tests such as the Chi-Square test. The Chi-Square test was used to find differences among subgroups of teachers when the data was broken down by gender, and experience (as represented by years of full time teaching experience, and highest educational level attained). The database format for the qualitative data allowed responses to be easily grouped by participant, school, and question so that stories worth telling could be identified.

The conceptual structure of the data analysis follows from the design of the survey. The first three questions ask about the range of how teachers experienced professional isolation and connection. This range was based upon teachers' experience as reported in the literature and in personal communication. The second three questions asked teachers to respond in depth to the items in the first three questions. Therefore, analysis of the second three questions was structured around the range laid out in the first three questions. The final two open ended questions were analyzed using

Novak's modification of Schwab's Four Commonplaces of Education
(Novak & Gowin, 1984; Schwab, 1973) (Schwab plus evaluation) as this
structure a) is important to the theory of meaningful learning, and b)
seemed to fit the data.

Significance of the study

A large amount of time, money, and material resources are invested in
the training of teachers. This training includes pre-service teacher
education programs, in-service programs, and on-the-job experience. If
teachers do not talk to each other about the work that they do, if teachers do
not seek and give assistance to each other, only a small portion of the
potential of the existing teacher training is being realized. By systematically
trying to understand the phenomenon (or at least provide a foundation that
others can build upon) of professional isolation and connection, we can find
ways to make teacher training resources go farther.

Professional Isolation and Connection: Definitions

This study began with a premise that no matter how effective or
exemplary a teacher may be, there will always be challenges which can not
be met alone. Therefore, one would expect that isolation, and especially
isolation in the professional sphere, would impede teachers' ability to meet
the challenges of teaching, and as a corollary, professional connection would
improve teachers' ability to meet their challenges.

I chose to define Professional Isolation as "A condition characterized by a teacher having a limited ability to seek the help of other people in solving problems or challenges of a professional nature, and where this limited ability interferes with a teacher's efforts to meet his or her goals. These goals, stated in an admittedly simplified form, are to create an effective learning experience for each student, and to achieve job satisfaction."

Similarly, I defined Professional Connection as "A condition characterized by a teacher having a supported ability to seek the help of other people in solving problems or challenges of a professional nature, and where this supported ability enhances a teacher's efforts to meet his or her goals. These goals, stated in an admittedly simplified form, are to create an effective learning experience for each student, and to achieve job satisfaction."

Organization of the thesis

Chapter 2 reviews the literature on professional isolation and related topics. Chapter 3 discusses the methodology used for the study. Chapter 4 describes the context of the study, including the response rate and the demographic characteristics of the sample. Chapter 5 reports the results with some basic analysis. Chapter 6 discusses the implications and conclusions from the results.

Chapter 2 - Literature Review

   This literature review contains four sections: professional isolation, exemplary teacher research, professional development schools, and network learning. These sections can be seen to relate to each other in two ways. First, the sections can be seen in the sequence of conceptual evolution that led to this dissertation. Second, the sections can be seen in the context of how they aid the understanding of professional isolation (a retrospective conceptual reconstruction).

   I was originally interested in teacher enhancement, and more specifically, computer-mediated teacher enhancement. This dissertation-directed interest, in turn, was a reaction to my Master's Thesis, in which I looked at theatre as education. While I could have done a dissertation which was simply an expansion of my Master's Thesis, I wanted a greater challenge, and since I have long held the belief that theatre and electronic media are simply parts of a continuum, rather than disconnected entities, conducting dissertation research on or with computers would provide a logical balance.

   Teacher enhancement needs an objective towards which teachers try to develop. The literature on exemplary teachers seemed like a logical place to look for such an objective. My search for a computer related dissertation topic took me to the work of TERC[1], especially their LabNet project. The

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[1] An independent education research group in Cambridge, MA. TERC used to stand for Technical Education Research Centers, but the name was legally changed recently so that it is now just TERC.

literature on this project, and especially an email conversation with one of the authors, led me to the idea of a "community of practice". This idea, a group of people who work on a common task and also communicate about that task to others, seemed like a powerful idea, but I had difficulty achieving clarity on how this could be used as the heart of a feasible study. Serendipitously, Dr. Sutphin came to my rescue with a presentation at a Cornell Education Society Seminar (a series of presentations on a variety of education topics sponsored by the Cornell Education Department's graduate student organization on behalf of the Cornell Education Department) in which he introduced the concept of network learning. After exploring the possible extensions of this concept, I came to the conclusion that network learning could provide a framework in which the idea of community of practice could be understood. Finally, Dr. Carlsen suggested that I review the literature on Professional Development Schools. This review has proved repeatedly valuable. All three sources, exemplary teacher research, network learning, and professional development schools, seemed to indicate that there was a conundrum that related to how teachers did or did not seek and give each other assistance. This convergence led to a review of all of the literature I could find on professional isolation itself. Both the literature and consultations with practicing teachers suggested that professional isolation was a problem worth investigating. The literature, while limited, had a fairly consistent pattern which suggested that a broad study which attempted to establish a foundation upon which future work could be built would be valuable. This study is the result.

When the relationships between the concepts in this literature review are examined from the perspective of professional isolation, a slightly different story can be told. The literature on exemplary teacher research is useful to an understanding of professional isolation because the exemplary teacher research literature is replete with possible sources of isolation and connection. The professional development school literature is important both because professional development schools are themselves a potential source of professional connection, and are also a structure within which other sources of professional connection could be supported. Finally, network learning is important to an understanding of professional isolation both because it sheds light on the uses of computer networks, a potential source of professional connection, and the ways such networks can both overcome and create distance, a potential source of professional isolation.

Exemplary Teacher Research

Exemplary Teacher research has two main strands. There are articles which attempt to define what an exemplary teacher would be. (Beisenherz, 1990; Hofstein, Ben-Zvi & Carmeli, 1990; Ladson-Billings, 1994) There are articles which interview exemplary teachers to learn how education works (what does it really mean to be an exemplary teacher and what does that tell us about how to improve education generally) or to get their opinions about education. (Davis, 1993; Foster, 1993; Gerber, 1992; Rud, 1989; Tobin & Fraser, 1988; Tyson, 1991; Wicklein, 1993)

Defining the exemplary teacher

When looked at together, the three papers which provide a catalog of characteristics of an exemplary teacher (Beisenherz, 1990; Hofstein et al., 1990; Ladson-Billings, 1994) , each in and of themselves, do not provide a complete picture of the exemplary teacher. The following table is my attempt to create a category system based upon the experts' definitions of exemplary teachers. In the final three columns, B = (Beisenherz, 1990), H = (Hofstein et al., 1990), and L = (Ladson-Billings, 1994).

Table 1: Categorized definitions of qualities which exemplary teachers should have as derived from the literature.

Category	Definition	Author		
Community	Teachers are members of learning communities.			L
	They are aware of successful programs and approaches; They scrounge activities.	B		
	They demonstrate leadership and commitment by active participation in professional organizations, offering workshops and presentations, working as a mentor with other teachers, working with student teachers	B		
Pedagogy	They perceive teaching as a creative process.	B		
	Implement diverse methodologies and activities in the classroom		H	
	Set a wide range of learning goals		H	
	Demonstrate a constructive approach towards teaching of the sciences		H	
	Convey to the students the relevance of science to the individual and society		H	
	Their method of teaching and instruction encourages critical thinking, curiosity, and interest, and high relevance to topics learned previously		H	

Table 1 (Continued)

Management	Teachers are responsible for managing and monitoring student learning.			L
	They have a vision of what successful teaching should accomplish	B		
	Create a positive learning environment		H	
Teacher as learner	Teachers think systematically about their practice and learn from experience.			L
	They take risks. ... try new ideas topics and techniques	B		
Skill	Teachers know the subject they teach and how to teach those subjects to students.			L
	Organize activities in the classroom		H	
	Carry out experiments that help students understand the scientific concepts studied.		H	
	Exemplary teachers have high confidence in and control over the learning material,		H	
	Clear and focused level of explanation		H	
	Preparation of the lesson with an explicit rationale		H	
	High awareness of cognitive difficulties		H	
	High awareness of individual progress		H	
Emotion	They have the confidence and motivation to achieve their objectives.	B		
	They demonstrate their enthusiasm in their teaching	B		
	They develop feelings of success and self-esteem	B		
	They beat their own drums	B		
	Teachers are committed to students and their learning. (in other words, caring.[2])			L

As can be seen from the preceding table, living up to the composite definition of an exemplary teacher is a challenge even under the best of circumstances. Moreover, a teacher's challenge is not limited to trying to

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[2] I figured out where to put this quality only after reviewing the results from the pilot study described in the next section.

live up to the definitions of exemplary teachers as defined by the experts. Teachers also need to live up to the expectations of their community. The community's expectations may or may not be the same as the expert's expectations.

In order to round out this literature review, learn how a community's definition of the exemplary teacher might differ from the expert's definition, and model a form of teacher research which could be used as one kind of substance for programs which seek to promote professional connection, I conducted the following pilot study.

Pilot Study of a Community's Views on the Exemplary Teacher

The purpose of this study was to survey a group in the community regarding their beliefs about exemplary teachers. Such results, while not necessarily representative of the community as a whole, are directly relevant and of interest to the target group. Such a survey could be used to build consensus, subpopulation by subpopulation, on what the community wants from its teachers. Once this is known, it should be possible to make the corresponding argument about what kinds of resources will be necessary to achieve these desired qualities.

I chose to survey the members of the Ithaca Area Toastmasters Club[3] because the members of this club represent a reasonable cross section of the Ithaca community (for instance, not just Cornell people). As a member of

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[3] A group of people who get together to help each other improve their public speaking skills.

this club, I had a willing pool of participants. Because I intended to use the results from this pilot study in a speech given at a club meeting, this pilot study implemented the principle of reciprocity[4] by my giving a speech which relates directly to the experience of the audience, a speech element that Toastmasters value.

The club has 23 members, not counting myself. The study was conducted as a telephone survey, although one response was sent in via email. 14 club members responded to the survey. Other club members were non-respondents because they were not home when I called. No one declined to participate.

Club members were asked the following.

"In your opinion, what are three qualities that an exemplary teacher must have?

To answer this question, please think about any exemplary teachers you may have had when you were in school, and think about what kind of a teacher you would want your kids to have when they are in school."

The table below groups and summarizes the responses. In a couple of instances, what a participant described as one quality fit into two distinct categories, and occasionally, a participant gave less than three qualities, so

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[4] The idea that a researcher should give something back to the participants, even if not contractually obligated to do so.

the total responses listed in the table do not necessarily add up to the

number of participants times three.

Table 2: Qualities which exemplary teachers should have as suggested by members of a public speaking organization during a pilot study conducted in order to round out the literature review of exemplary teacher research (N = 14).

Qualities of an Exemplary Teacher	# of responses
Knowledgeable	6
Teach students as individuals, concern for individual needs	5
Enthusiasm, ability to enthuse to communicate it, passion	4
Respect for students as equals, fair and even, non-discriminatory, openmindedness	4
Willingness to push the students, firmness	4
Caring (Dedication, compassion, empathy, genuine interest in student learning and student teacher relationship)	3
Creative	3
Patience	2
Sense of humor	2
Teacher is accessible to student	2
Good Communicator	2
Ability to get knowledge	1
Being prepared	1
Good in dealing with kids	1
Good listener	1
Honest	1
Interactive teaching style	1
Make learning fun and exciting	1

This pilot study resulted in an unexpected benefit because it helped me to

achieve greater clarity with regards to one of the qualities found in the

literature, Commitment. By seeing commitment in the context of pilot

study responses which I characterized as Caring, it was clear that

commitment as discussed in the literature fits under the Emotion category

in Table 1.

The qualities found in the literature and the qualities expressed by participants in the pilot study are similar, for the most part. The one major category expressed in the literature which was not expressed by pilot study participants was "community." The one quality expressed by pilot study participants which was not found in the literature was the idea that an exemplary teacher should be willing to push their students in order to achieve their potential. The complete text of the speech which was developed from this pilot study and literature review can be found in Appendix C.

Researching Exemplary Teachers to learn how education works

Exemplary teacher research generally starts by selecting a pool of teachers who are known to be exemplary. This can be accomplished by judging teachers against the criteria such as those discussed in the previous section, by selecting teachers with more than a certain number of years of experience, by selecting teachers who have been nominated as exemplary by their administration or students, by selecting teachers who have won an award for their teaching, by observing teachers teach, or some combination of these methods.

This section will describe two types of findings from the exemplary teacher research literature. First, I will highlight literature which shows how exemplary teachers' descriptions of their educational philosophy are consistent with meaningful learning. Second, I will describe observations made by exemplary teachers which relate to the question of professional isolation.

<u>Exemplary Teachers and Meaningful Learning</u>

The idea that the parts of learning are most effective when they are connected to each other is central to meaningful learning. Exemplary teachers recognize several manifestations of this idea. "The teachers integrate all five commonplaces [of education]" (Gerber, 1992, p. 229), including Novak's fifth commonplace, evaluation. "Rather than viewing evaluation as an ending point, these teachers use evaluation to start the learning process." (Gerber, 1992, p. 232) Within the commonplace of subject matter, exemplary teachers emphasize the integration of subject matter "as a means of making learning more meaningful for students." (Gerber, 1992, p. 232) Finally, and perhaps most importantly, exemplary teachers have a "desire to relate the curriculum and all learning experiences to their students' prior knowledge." (Gerber, 1992, p. 232)

Exemplary teachers also recognize that this approach to learning does not apply only to their students. The need to learn applies to themselves too. As one teacher in Gerber's study put it, "You just have to come in with the idea that you're going to be learning yourself. And you have to want to learn." (Gerber, 1992, p. 135) Taking this line of reasoning a step further, it would be reasonable to argue that while a desire to learn is all well and good, that desire is only worth so much if it can not be demonstrated that learning is taking place. Fortunately, there is some evidence that teachers learn from their experience. For instance, Tyson found that experienced teachers' responses to interviews about their views on exemplary teaching

were more specific and detailed than novice teachers' responses. (Tyson, 1991)

Generally, "learners do not understand their cognitive learning processes."[5] (Novak, 1995) However, it has been shown that students can be taught in such a way that they can understand. (Gangoso, 1996) Tyson would concur that helping teachers make their understanding of their learning process explicit is important when he suggests that "novice teachers could participate in semi-structured interviews about their views on exemplary teaching both as interviewees and interviewers." (Tyson, 1991, p. 89) Such a teacher research project could help teachers take ownership of the idea of exemplary teaching, rather than seeing exemplary teaching as something which others try to impose upon the teachers.

Exemplary Teachers and Professional Isolation

The literature on exemplary teacher research was useful in that it offered suggestions for possible sources of professional isolation and connection. A number of these sources were included in the final version of the survey used for this dissertation.

"Cooperating teachers ... reinforce the method of learning to teach by experience rather than by observation and analysis, as evidenced by their lack of interest in allowing student teachers to visit other classrooms." (Richardson-Koehler, 1988) This was one idea derived from the literature

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[5] Principle of Meaningful Learning #19.

that led to the isolation question item 'Lack of peer observations (observing each others' teaching)'.

Clashes in educational philosophy among groups of faculty can create isolation. (Foster, 1993) This was one idea derived from the literature that led to the isolation question item 'Differences in educational philosophy'.

Another exemplary teacher in Foster's study commented, "We [teachers] see one succeed and, rather than trying to understand the basis of their success, we try to tear down. In my school there is a culture of failure, against success and doing well, for kids and teachers. ... It's sad, but if you want to be successful in my school, you have to isolate yourself, be a loner." (Foster, 1993, p. 18) This did not make it into the survey. It is certainly an observation worth pursuing, but it requires more explanation than can be fit into a short survey question.

One teacher in Gerber's study attributed feelings of collegiality among teachers resulting from being allowed to go to a lot of conferences. (Gerber, 1992, p. 204) This was one idea derived from the literature that led to the connection question item 'State or national conferences (STANYS, NAAEE, etc.)'.

"Novice teachers need mentor teachers to expedite development." (Gerber, 1992, p. 211) This was one idea derived from the literature that led to the connection question item 'Successful orientation or mentor program for new teachers'.

Gerber found that "another overt similarity among the four [exemplary] teachers is the inordinate amount of time they devote to educational organizations outside of their classrooms." (Gerber, 1992, p. 225) This was one idea derived from the literature that led to the connection question item 'High participation in professional organizations'.

Support groups appear to be important to exemplary teachers. For instance, one teacher talked about a breakfast club, a group of several teachers in her building who meet regularly in the morning to discuss important issues. (Gerber, 1992, p. 227) This was one idea derived from the literature that led to the connection question item 'Informal teacher networks or support groups'.

In addition to suggesting several possible sources of professional isolation and connection, the literature on exemplary teacher research suggests several correlations and predictions which are relevant to the study of professional isolation and connection.

One teacher in Gerber's study asserted that the isolating nature of classroom teaching has been decreasing and that there is more collegiality, largely because teachers have been allowed to go to a lot of conferences, and take courses with other teachers. (Gerber, 1992, p. 204)   Another teacher asserted that teachers aren't isolated anymore. (Gerber, 1992, p. 228) The results of this dissertation will provide qualified support for this assertion.

"All four teachers [in Gerber's study] emphasize[d] that their professional dialog with colleagues was a crucial factor ... for their theoretical growth from the initial years to today." (Gerber, 1992, p. 226) This experience could

be used as the basis for a hypothesis for a future study. For instance, the results from items in Questions 1 and 2 which relate to professional dialogue could be examined. Appropriate new research questions could then be created.

"Faculty in successful schools are more likely than their counterparts in less successful institutions to interact in collegial and professional relationships, or to possess shared goals and a positive sense of community." (Foster, 1993, p. 20) One could test this assertion in a future study by collecting information on the relative 'success' of each school for which there is also information on the teachers' experience with professional isolation and connection.

Gerber's assertion that teachers are not isolated anymore can be compared with the results of this study. The other observations could serve as hypotheses for future studies of professional isolation and connection.

Problems with Exemplary Teacher research as a research specialty

The trouble with exemplary teacher research is that teachers often associate the phrase 'exemplary teacher' with the job evaluation process. As a result, the researchers can find themselves in the middle of school politics, when all they wanted was to understand teaching and learning.

Exemplary Teacher has become a taboo research specialty in part because teachers get defensive that either you have defined an exemplary teacher and you are going to evaluate them (nobody likes to be evaluated because

they might be criticized), or because you have set a standard which they don't meet, or because you are creating elites.

However, exemplary, in my view, is best seen from an individual perspective. It is a target to aspire to. But you have to be driven to get there, and ultimately, the drive that will take you all the way must come from inside. This of course is the main problem with exemplary teacher as a research specialty. By definition, you can't get internal motivation directly from someone else. And given the status chasm between teachers and education researchers, a lot of teachers are not likely to listen to a researcher's exhortations about becoming exemplary.

Exemplary teacher as a research specialty should strive to create external motivation. The people the researchers (and teachers who believe that even expert teachers can continue to learn and should desire to do so) need to exhort are parents. We should help the parents become explicit about what an exemplary teacher is. This would most likely come from exemplary teachers the parents experienced as students, and from whatever ideals they can imagine as what they would want for their kids in today's schools. These desires, once lit in the parents, should create a source of external motivation for the teachers. The difficult part will be finding ways to convert the external motivation to internal motivation, as well as finding funding to help all teachers make exemplary teaching their goal. While it may be difficult, if the parents have been involved in formulating the desires for exemplary teaching from the beginning, it should not be impossible.

Professional Development Schools

   The literature on Professional Development Schools reveals four themes:
Community, Reflection, Research, and Culture.

   What is a Professional Development School?

   A Professional Development School (PDS) refers to an elementary or
secondary school which has entered into a partnership with a university
department of education for the purpose of supporting the professional
development of teachers in the school and teacher education students (pre-
service teachers) from the university. Generally, the school appears to make
a commitment to being a PDS as an entire school. The problem with this
definition is that PDS efforts often seem to be led or at least initiated from
the university, or have a semi-independent governance structure. For
purposes of clarity, I will use the term Professional Development
Partnership (PDP) to refer to the full structure of the collaboration between a
university and one or more schools for the purposes of professional
development, and I will use the term Professional Development School to
refer to schools which have committed to such a partnership.

   Community

   Student teachers working in a PDS "have the benefit of working with a
group of student teacher colleagues" (Schneider, Seidman & Cannone, 1994,
p. 22) in contrast to the standard placement where a student teacher may be
the only student teacher in the school. This benefit occurs because "there is

a critical mass of student teachers [six to eight at each site] who share a common base of experience and knowledge." (Yopp, Guillaume & Savage, 1993, p. 31)

This critical mass allows what might otherwise be problems to become opportunities. In one PDP, the geographical distance of the teaching site from the university, combined with car pooling, created opportunities to build community. (Schneider et al., 1994, p. 28) Moreover, the critical mass creates opportunities for risk management: there is more than one student who has a car which can be used to get to the PDS if someone's car breaks down. (Schneider et al., 1994, p. 29)

The community aspects of a PDP can benefit the teachers and the school both directly and indirectly. St. Ann's Academy reported some of the direct benefits they received. "Feedback from elementary school teachers indicated that their pupils sustained on-task behavior and improved time-on-task and mastery learning. These gains were attributed directly to the presence of Neumann [university] students and their availability for tutoring and instructing small groups." (Samaras, Taylor & Kelly, 1994, p. 70) Teital reported a school which experienced indirect benefits. The PDP project served the function of an educational campfire to hold the wild animals at bay. They observed that "we found ourselves saying, 'We can't believe we are building in innovation in this time of trouble.' We learned that it is not impossible to do good things in difficult times." (Teitel, 1993, p. 90) See also: (Dillon, 1995)

PDP has several aspects in common with Communities of Practice.[6]   For instance, both approaches put an emphasis on creating community by having people work on a common task. "Equity ... is best built by bringing the different parties together to work on a common project that offers them a chance to move beyond the status quo." (Schneider et al., 1994, p. 26)

As with communities of practice, PDPs often are developed with an objective of reducing teachers' professional isolation. (Lemlech, Hertzog & Foliart, 1993, p. 22; Schneider et al., 1994)

Reflection

PDPs often stress the important role of reflection in professional development. "The usual crush of classroom events provides little time for most teachers to think and talk about their teaching. This model provides a vehicle for reflective practice." (Yopp et al., 1993, p. 32) This emphasis on

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[6] Community of Practice, as I understand TERC's use of the term, implies a small group working together on a regular basis. However, it also implies a larger network in which people can exchange ideas regarding a common professional interest.

One might say that a Community of Practice needs two characteristics: people working together, and an ability to communicate the needs and the results of that work to others. Given these characteristics, I would argue that Community of Practice could be seen as a unit of analysis. For instance, we might ask, How can we create a community of practice within a single classroom, and How can that community of practice be linked to other, larger Communities of Practice?

In other words, a Community of Practice could have a fractal structure, where what appears to be a single Community of Practice when seen at one scale, can also be seen to be composed of smaller Communities of Practice linked together when seen at another scale.

reflection interacts with the emphasis on community. "Sharing experiences rather than reflecting on them in isolation enhances learning." (Schneider et al., 1994, p. 26)

Changes may have to be made in a school's schedule to allow for this reflection. "A new structure was developed so that school faculty members were given time to personally work through each lesson before it was taught to students." (Stoddart, 1993, p. 15) Such changes may require changes in staffing. "Although there are creative ways to involve interns in conducting the business of partner schools, it is reasonable, nonetheless, to assume that an elementary school faculty of 35 teachers should be increased by at least 3 to enable that school to function effectively as a partner school." (Goodlad, 1993, p. 37)

Reflection is applicable to all participants in a PDP. Reflection affects the work of the student teachers. "The restructured practicum experience allows students to utilize their theories about teaching and problem-solving with a live audience before they begin student teaching." (Samaras et al., 1994, p. 71) Reflection affects the interaction of teachers with student teachers. "The partners undertake teaching each other." (Lemlech et al., 1993, p. 22) Reflection affects the relationship between teachers and students. "None of the goals of the school can be accomplished unless the teacher has the time to know Maurice [the student] well. Every goal is compromised when there is insufficient time for genuine interaction between the teacher and each pupil." (Murray, 1993, p. 66) Reflection affects administrators. "By participating in ... inquiries into their own practice, administrators would be modeling reflective practice and thereby

encouraging their teachers to also engage in reflective practice." (Stevenson, 1993, p. 108)

As important as who practices reflection in a PDP, it is equally important how reflection is practiced. Some PDPs stress observations of the teachers which are not meant as evaluations. (Schneider et al., 1994) This approach to observation of teaching is similar to peer coaching. (Carlson, 1995)

Research Issues

Participants in a PDP have to consider questions of appropriate approaches to and uses of research which neither teachers nor university researchers must confront outside of a PDP.

Divergent short term goals are a barrier to collaborative research between researchers and teachers. (Feldman, 1992) Both teachers and researchers want to improve education in the long term, but a teacher's short term goal is to help her particular group of students, while a researcher's short term goal is to separate pattern from noise in our understanding of how education occurs.

I believe that collaborative research between researchers and teachers is possible. It is possible to offer some common sense guidelines to anyone considering such collaboration.

"PDS inquiry is about the understanding of the particular case, whereas traditional university-based inquiry seeks more universal explanations and contributions to general theory." (Murray, 1993, p. 68) For instance, a wide

reading of often contradictory literature is a standard part of university based research. Reviewing the literature in the context of local inquiry to the extent that it is often done in university based inquiry may not be the most important use of participants' time. This can be hilighted by Stoddart's experience where a "problem arose [as to] whether the group should review the large and somewhat confounding literature on class size and what questions they should answer." (Stoddart, 1993, p. 11) Under other circumstances, the role of literature can be quite valuable to local inquiry. Williams reported a project where, in an early stage of their efforts, "a professional library on school restructuring was assembled and shared." (Williams, 1993, p. 213) Evidence for the positive results of such sharing of literature can be seen in one teacher's comment as a result of participation in a PDS, "I also try harder to keep up on the research and apply it." (Lemlech et al., 1993, p. 23) Literature can also be a problem on the publishing end. For instance, Goodlad reported that "Little of it [the research] was communicated directly back to the sites, and the forms and means of writing it up and publishing in refereed journals made the results almost inaccessible to practitioners." (Goodlad, 1993, p. 29) See also: (Johnson, 1989) Thus local inquiry needs to find appropriate ways to use the existing literature, and participants in local or PDS inquiry need to find appropriate ways to communicate those results to both university and school based audiences.

  Schneider suggests that one of the roles of a PDP is to facilitate access to university resources for teachers' own growth. (Schneider et al., 1994) I think that this would make a good guideline for how to focus teachers'

involvement with the research process. The focus of the research should be teachers' growth more than contributing to general theory. This is not to say that teachers can not make contributions to general theory, but that if they want to, it would require a time commitment above and beyond the normal call of duty for a teacher. This guideline is confirmed by a specific example of teachers involved in research.

Research in laboratory settings found that young children could not take the point of view of others, but "when teachers and mothers researched these issues, based upon their unique familiarity with children and as part of their graduate research training in the 1970s, they devised experiments that showed that young children were able to take the point of view of others. ... These experiments led to a reevaluation of the child's cognitive competence that, in turn, supported the invention of pedagogical techniques, such as cooperative learning and reciprocal teaching." (Murray, 1993, p. 69)

The point here is that while the teacher's perspective was critical to this research, the teachers in question had taken on the role of graduate students when they conducted the research.

One possible future area for collaborative research which would meet both teachers' and researchers' short term goals is the area of whole class therapy, especially for stuttering. Whole Class Therapy is a concept where you would involve the entire class in speech therapy, not just the child stutterer. Since a large part of the pain the child stutterer experiences is due to the hostile environment the other kids create, whole class therapy would help

both the stutterer and the therapy by reducing the hostility of the class environment. This would represent an opportunity for a PDS to create a PDP-like collaboration with a different kind of university based pre-service program: a program such as the Ithaca College Speech and Hearing Clinic, which trains speech clinicians. Whole Class Therapy is an approach which has not been tried as such to date.

Culture Issues

It is important to keep in mind that schools and universities not only have different short term objectives, they also have different cultures. (Samaras et al., 1994, p. 71) The divergence of cultures manifests itself in a divergence between the views of pedagogy espoused by university and school faculties. This divergence has "been observed across the country." (Stoddart, 1993, p. 7) This is in part why "it is vital that the teacher training institutions not approach the schools with a fixed reform agenda of their own. An attempt by the higher education institution to propose a theoretical model could damage a collaborative relationship from the beginning." (MacNaughton & Johns, 1993, p. 218) University researchers need to start by accepting the validity of the schools pedagogy (even if they don't agree with it). All parties to the partnership need to enter with a willingness to learn from each other.

The divergence also manifests in how different participants think which aspects of a PDS are important. Moore et alia conducted a survey asking teachers, principals, and teacher educators to rate how important various aspects of a PDS were to them. The survey appears to indicate that the

various participants most strongly support those aspects of PDS which most strongly benefit themselves. For instance, Teacher Educators expressed significantly more support for "reward system for Professors" than the other two groups. These results support the observations made in other articles about the differences in school and university culture, and the differing goals that each group has that need to be meshed or negotiated for a collaboration to succeed. (Moore & Hopkins, 1993, p. 220)

Where the cultures are not only different, but conflicting, there is potential for the professional development of the student teachers to be impeded. "Caught in the middle, the student teacher feels the skepticism of public school faculties towards the university and the devaluing that university faculty may harbor about the school faculty. The result, in the conventional student teaching structure, is a student teacher caught between two worlds and incapable of receiving the full support of either party." (Schneider et al., 1994, p. 23) There can also be conflict between the role of the teacher education student as classroom aide versus developing teacher. (Samaras et al., 1994) Some of the culture conflict can be avoided by being careful about the roles everyone is playing. "The university group realized that it needed to give teachers the opportunity to experience the new instructional approaches as learners, that it should act more like teacher educators than expert classroom teachers modeling practice." (Stoddart, 1993, p. 14) In other words, being a teacher educator and being an expert classroom teacher are not necessarily the same. Teacher educators have important skills and understandings to bring to a PDP, but the teacher educators must acknowledge the value that practicing teachers bring to the

partnership. This value has much to do with being an expert classroom teacher.

Conflict due to role applies to administrators as well as teachers. Role conflict is greater for administrators than it is for teachers because administrators must balance bureaucratic needs with the need to be an instructional leader. (Stevenson, 1993, p. 107) There are ways to manage conflict (or to make conflict productive) which will help forge a healthy, joint culture of the partnership. The first step is knowing the participants. "We need[ed] to be 'people' to one another before moving forward on details of the project." (Teitel, 1993, p. 91) The second step is to find ways to mesh the goals of the school with the goals of the collaboration. (Teitel, 1993, p. 90) But above all, potential PDP participants need to remember that "since trust and commitment take time and require intensive interaction to develop, the time needed to establish collegial relations between school and university faculty is frequently miscalculated. Allocated time is as important to professional relationships as it is to mastery of basic skills." (Lemlech et al., 1993, p. 27)

Thus, Professional Development Schools have a great deal to do with forging community, both as individuals joining a new organizational entity as well as groups whose cultures must be merged. Professional Development Schools must allow time so that all participants can see the value of the community being built. Finally, research should be conducted which is sensitive to the needs of all participants in order to improve the community being built.

Network Learning

I am using the term network learning as a convenient way to look at a variety of related ideas. I was introduced to the term when Sutphin talked about network learning vis a vis the Cornell Agriculture College's relationship with the Geneva Experiment Station. (Sutphin, 1995) In this literature review, I have started from Sutphin's foundation, and built from there.

Logically, network learning has several possible meanings. It can mean learning with other people who are located in various places on a computer network. In this sense (if you place emphasis on the distributed nature of the network), network learning has a strong relationship to distance learning. Distance gives the participant an improved ability to reflect on one's learning practice. On the other hand, if you place emphasis on the people who use the network, network learning implies learning with an important social dimension. It can mean learning by accessing information resources which are located on a computer network. In this sense, network learning is related to computer aided instruction. Network learning could refer to the way that information is arranged and taught. Information is not assumed to be presented in a single, straight line, but rather exists in a system of multiple, branching paths.

Distance

Network learning can be used to bridge many kinds of distances.

Traditionally, network learning has been thought of as a way to bridge geographical distances, such as in Alaska where email is a means of communicating with teachers and submitting lessons. (Cadigan, 1993)

There are many other kinds of distance which we might want to bridge.

Participants in a LabNet study lived "in regions across the nation, from New York to New Mexico." (DiMauro & Gal, 1994) Asynchronous communication, a condition for successful network learning as well as reflective practice, bridges the communication difficulties created by different time zones. As DiMauro points out, the reason that asynchronous communication is compelling is not so much the difference in time zones themselves. People are aided by an ability to respond when it is convenient for them. Especially in large groups, matching schedules for a meeting can be difficult when everyone is in the same time zone. The farther apart the partners are, the more difficult it becomes because most people's schedules are organized around the progression of daylight. People in different time zones are not only busy, but are also out of phase with respect to each other.

Beyond distances of geography and distances of time, network learning has the potential to bridge social differences.

LabNet tries to integrate teachers, scientists, and educational researchers into an educational community of practice. (Ruopp, 1993b) The divergent culture, language, and goals of these groups are every bit as much of a potential obstacle to working and learning together as geographical distance. One cultural element which has the potential to create distance is budgets.

For instance, "elementary and middle school teachers have smaller budgets than do high school teachers." (Rhoades, 1993, p. 31)

A seemingly paradoxical distance aspect of network learning is what might be called the relativity of distance. A teacher may be closer to (in the sense of having easier access to) people who are hundreds of miles away than they are to people in their local or proximate community. "Teachers often do not have the luxury of leaving their classroom to converse with their peers and are often limited to brief meetings with others that occur during the school day free periods. Yet, due to the existence of an on-line community of teachers, proximate relationships can develop with other local teachers due to the conveniences of communicating with other community members asynchronously." (DiMauro & Jacobs, 1995) Or to paraphrase the main character in Edward Albee's play <u>The Zoo Story</u>, sometimes you have to go a long way out to come a short way home.

Social

Network learning not only seeks to accommodate distance and isolation, it proactively seeks to create a computing environment which is social.

Social relationships are important to learning. They allow teachers to work together to provide the best help to students, such as at the Renaissance School in New York City. (Firestone, 1995, p. A1) Strong positive relationships between teachers and parents help in the identification of appropriate forms of participation for the parent in their child's school. (Scott-Jones, 1995, p. 31)

But educators are often isolated. "Isolation is a fact of life for many high school teachers of science, particularly those working in rural schools. They are often solo practitioners in their schools." (Ruopp, Pfister, Drayton & Gal, 1993, p. 4) This isolation is a problem, in the opinion of an exemplary teacher, because "having colleagues to talk to is the most important factor in developing one's theoretical framework." (Gerber, 1992, p. 89)

One way to overcome this isolation is to encourage educators to work in small groups. Small groups working together on a regular basis on a common task is an important part of community of practice. (Ruopp, 1993b, p. 309) One way that LabNet has seen the creation of such small groups includes a number of participants applying together for a grant.[7] (Ruopp et al., 1993, p. 7)

Applying for grants together, a small step in the process of overcoming isolation, is not the only step educators can take. Teachers must take leadership roles for a community of practice to develop. (Ruopp et al., 1993, p. 9) One way to help teachers take leadership roles is for teacher enhancement programs to develop "skilled moderators [who] play essential leadership roles using a variety of modes of communication to nurture collegial connections and reflective conversations." (Spitzer & Wedding, 1995) This kind of bigger step requires more effort on the part of the teacher enhancement program and the teachers themselves both.

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[7] LabNet, as part of their work, created a series of Big Idea Grants where teachers would propose and receive funding for proposals to disseminate the work that they had done through LabNet.

A leadership role, however supportive, is also a position of authority. This position of authority can be an obstacle to creating effective social networks. "As teachers, they work in a position of authority over their students, however, they often have little authority over their teaching peers." (DiMauro & Gal, 1994)

Keeping open avenues of personal contact with the leadership can ameliorate this obstacle. As one LabNet participant remarked, "The main reason for staying with LabNet is the fact that I have personal contact with the leadership involved with the network, along with the participants, many of whom I know on a personal basis." (Anderson, 1993, p. 36)

The benefits of a social network include the ability to share uncertainties with one's colleagues (Thompson, 1993, p. 28), and "email ... [which] becomes a social tie and [which] results in friendships developed at both the peer level as well as between students and teachers." (Cadigan, 1993, p. 33). Informal structures, such as visits to other scientists' labs and conversations in hallways and over coffee, are an integral part of the way that scientific knowledge grows. (Feldman, 1994, p. 1) My own work confirms Feldman's observation. At several points as I was writing my dissertation proposal, five to ten minute conversations with fellow graduate students have let me see my work from a new perspective, creating a breakthrough which allowed the work to progress. This process of growth through exchange also applies to teachers. "A significant source of teachers' knowledge is their interaction with other teachers" (Feldman, 1994, p. 2) Network learning can make this interaction more likely to happen.

The social dimension of network learning helps to put the research issues aspect of Professional Development Partnerships in a new perspective. For instance, if a PDP wanted to engage teachers in literature review, they should make the literature review become an opportunity for interaction with other teachers, and not solely an opportunity for interaction with the literature. We need to recognize that even though network learning will be improved, it will never, by itself, be a complete answer. "We have learned through previous research that a network-mediated community must be complemented with face-to-face meetings and telephone contact for most effective team building (Gal and DiMauro, 1993; Katz, M. 1991)." (DiMauro & Jacobs, 1995) This limitation hints at the next great challenge for network learning. "The validation, camaraderie and support that occurs, or has the potential to occur, on the network have few opportunities to be integrated into the school setting." (DiMauro & Jacobs, 1995) We must find ways to bridge the learning that occurs in the network community with the learning that occurs in the proximate community.

Branching Paths

The theme of branching paths runs throughout the literature on network learning, both for students and teacher/curriculum developers.

Ideally, students "can enter the curriculum at many points." (Navarro, 1995) Once in the curriculum, the students should be able to hear multiple voices. (Gal, 1993, p. 40)   Network learning often makes use of project enhanced student learning (PESL). "The basis of PESL is for teachers to make a dramatic shift away from text-book based, encyclopedic coverage of

science topics towards a more learning centered approach that emphasizes student inquiry and investigation." (DiMauro & Gal, 1994) In a full implementation of network learning, a more open ended inquiry based approach most likely will demand a MORE comprehensive coverage of science topics. The difference is that in a text book based approach, coverage refers to what every student must cover in class (where all students follow the same curricular path), while in an inquiry approach, coverage refers to the material which each student has access to support the inquiry. When one looks at the class as a whole, they would be seen to branch through this material. Another aspect of branching relates to evaluation of a class as a whole. For instance, in an evaluation of LabNet, Ruopp found that students were "asking more questions that reached beyond standard course content." (Ruopp et al., 1993, p. 3) If a teacher's goal is to help students develop internal motivation to learn, questions which branch out and beyond what is required for a test seems to be an indication of such motivation. One interesting example of branching which goes beyond standard course content was developed by LabNet teachers and students. They developed a science contest where the pool of participants expands, rather than contracts, as the contest proceeds. The early participants become experts to assist the new participants. (Ruopp et al., 1993, p. 18)

   Curriculum development incorporates branching in that teacher enhancement programs, such as LabNet, do not push a fixed curriculum. Rather, they work with teachers who want to grow in their craft by providing them with support. (Ruopp, 1993b) We need to be prepared to deal with branched and distributed curriculum development for at least two

reasons. Currently, "becoming a department chairperson or a curriculum developer are two of the more common ways for teachers to progress in their profession. Both options, however, fall short of ideal, since the way to be recognized for doing your best is often to be removed from doing it." (DiMauro & Jacobs, 1995) This suggests that we might want to distribute curriculum development responsibility across more teachers as a way of reducing professional isolation. Furthermore, in some contexts, this distributed curriculum development may be a by-product of reforms implemented for other purposes. For instance, there is a movement in New York City to create small public schools. (Dillon, 1995; Firestone, 1995; Mosle, 1995) Many of these schools have eliminated most of the support and administration positions so that they can put all of their staff into their classrooms. This raises the teacher:student ratio, but it also means that curriculum development will have no choice but to become more distributed.

Sociotechnical conditions which help reflective practice occur more readily (DiMauro & Gal, 1994) may also be helpful to network learning in general. One such condition is structured dialogue. "A dialogue needs to have an organizing principle, progressing from detailed personal accounts of one's own experiences to shared perceptions. This is followed by reflection on action and on the experience of sharing expertise." (DiMauro & Gal, 1994) To understand the importance of this condition, consider the difference between face to face conversations and on-line conversations. A face to face conversation may touch upon many subjects, but barring such extra work as a transcript, the conversation exists in a temporal, linear flow.

An on-line conversation, especially in a discussion environment such as a conferencing system which supports multiple topics and threads, can move in several directions at once. Participants in the conversation can refer back to and build off of comments other participants made days or even years back in the conversation. While in practice the branching of such on-line conversations collapse after they reach only a moderate level of complexity, I believe it is worth asking the question, How we can make use of the potential of branched conversations, not only for curriculum development, but for network learning in general?

Communications

Teaching is often characterized by blocked communication. "Teachers often do not have the luxury of leaving their classroom to converse with their peers and are often limited to brief meetings with others that occur during the school day free periods." (DiMauro & Jacobs, 1995) Because teaching is so time consuming, and teachers are often so overworked, they are also "rarely in a position to know about ... developments" in the larger field of education. (Ruopp, 1993a, p. 52)

Network learning can facilitate teachers' communication with each other. "The sine qua non of the LabNet experience for most teachers was that they were talking to their peers: other practitioners of the craft of physics teaching." (Spitzer, 1993, p. 49) This communication is important because collaboration results in "the opportunity to have meaningful professional dialog with other adults." (Feldman, 1992, p 2) Even though network communication can make communication easier for teachers, this

communication still needs to be actively supported, in part because of the enveloping pressures of teachers' jobs. One of LabNet's Teacher Leader Coordinators commented on the importance of this active support by saying "I am a periodic reminder of the existence of LabNet and its abilities to help them in their teaching." (DiMauro & Gal, 1994)

Communication from teachers outward to others is just as important as communication from teachers inward to other teachers. For instance, affiliated participants of LabNet report back to the community on how the application of knowledge worked. (Gal, 1993) Such outward communication is also relevant to other educators, such as parents. "In a time of budget crises and bursting enrollment, the city's effort to found dozens of small boutique schools may seem quixotic. Yet parent organizations have begun to organize visits by their members to a dozen influential small academies, and they are returning to their old schools with new demands." (Dillon, 1995, p. B6) Outward communication can sustain momentum for school reform, even in times of budgetary cutbacks. This is important to keep in mind when developing a strategy to develop and maintain support for network learning.

It is important to keep in mind that part of what sustains open communication is access to a variety of levels of privacy for that communication. For instance, "some teachers choose to 'listen & learn' before publicly participating in the network [conference areas]. Teachers have reported that they feel intimidated by the number of participants and the level of these participants' expertise. In addition, silent members are sometimes new members who choose to spend time becoming acquainted

with the 'culture' of the network before posting - observing the subtleties and nuances of the on-line community prior to becoming a public participant." (Jacobs & DiMauro, 1995)   Some communication is carried on private email, which is sometimes more appropriate for private professional conversations. (Jacobs & DiMauro, 1995) This variety of types of communications channels is important to successful network learning. For instance, some teachers expressed a frustration that PSInet had no forum to speak of and was mostly used for email. (Rhoades, 1993, p. 30) This issue of privacy can be thought of more generally as a need for "protected workspace for reflection. To encourage openness, a private workspace is essential. For example, in this program [LabNet], the TLCs (Teacher Leader Coordinators) were able to feel at ease because the dialogue took place on a forum that was secluded, only the TLCs and LabNet staff had access to the posted messages. They were not subject to scrutiny by peers outside the group, and therefore were able to answer the questions honestly and to provide specific details of their practice with full knowledge that they were conversing about a shared experience with other TLCs." (DiMauro & Gal, 1994)

  To summarize, network learning can be seen as an attempt to bridge distances, by encouraging communication with attention paid to the social nature of that communication as well as the subject matter of that communication. The subject matter is a body of knowledge which participants have in common, but through which each moves along his or her own path.

Professional Isolation

   As can be seen from the preceding sections, the issue of professional
isolation emerges in personal, organizational, and social forms from the
literature on exemplary teacher research, professional development schools,
and network learning.

   The earliest direct reference to professional isolation is a dissertation
entitled "Feelings of Professional Isolation among Teachers." (Zachmeier,
1969) This study considered self contained classrooms as the primary source
of isolation, and viewed cooperative, team teaching as the best way to
combat it. This study also attempted to compare the professional isolation
of teachers with that of non-teachers. One of Zachmeier's major claims is
that "Level of assignment [grades taught] and organization for instruction
are factors which exert some significant influence on feelings of professional
isolation while sex and years of experience are less important. Elementary
school teachers feel less isolated than high school teachers, and team
teachers feel less isolated than teachers in more conventional
organizations."

   The literature which addresses professional isolation directly includes an
in-depth study of one Vermont schoolmarm and her one room
schoolhouse. This teacher suffers from professional isolation, which is not
completely negative in that isolation also allows her autonomy. (Kenny,
1989)   This study concludes that the one room schoolmarm in this study
experiences less isolation than former teachers of the school, but "her
feeling that she is alone is a constant reality." (Kenny, 1989, p. 105) This

study provides a very rich depiction of one school. The study also does a good job of putting the one room school in its historical context.

Another study examined the extent to which teachers perceived themselves as working in isolation from their colleagues. This study also explored the balance between isolation and autonomy. This study worked with 8 teachers. (Minaker, 1993) Minaker found that "the physical isolation of the working arrangement of teachers does not necessarily lead to social isolation. ... However, preservation of autonomy is not a desire for social isolation and total independence. Teachers are not reluctant to collaborate with colleagues, although they find little time to do so." (Minaker, 1993, p. v) Minaker defined isolation as "Isolation is to be understood as a working condition which limits teachers from frequent and meaningful feedback and support from other adults." (Minaker, 1993, p. 2) The eight teachers in this study had varying views on isolation. "The teachers in this study spoke positively about sharing with one another but they also valued their right to determine when or if collaboration should occur." (Minaker, 1993, p. 55)

A fourth study extrapolated from the literature to create a model of collegiality as a way to address professional isolation. This model included teachers planning and conducting their own in-service workshops, teachers observing other teachers teaching, scheduled professional dialogue, and the role of the principal in initiating and facilitating a collegial climate of interdependence within the school setting. This model was then implemented in one elementary school. This study worked with 30 teachers. (Young, 1988) Young defined Teacher Isolation as "A condition which exists when a teacher assumes nearly sole instructional

responsibilities for a group of students within the self-contained classroom structure of a traditional elementary school, and planned teacher interactions are minimal." (Young, 1988, p. 14) The common thread to Young's findings is that an "emphasis [should be made] on reducing teacher isolation by perpetuating a collegial expectation in the workplace that [gives] license to teachers to assist each other in the business of teaching." (Young, 1988, p. 107)

   The literature which addresses professional isolation through mentoring includes a study of the blind journal technique, a technique for encouraging anonymous reflection. The author reported that this technique reduced professional isolation. The study included 27 teachers. (Agor, 1985)   While this study does discuss the question of isolation, it is incidental to the study's main focus. One of the more interesting points of view is the author's underlying contention that even peer observation can be too invasive. The study extends from this contention as a development and user testing project to create a process which provides both observation and anonymity.

   A second study looked at the peer clinical supervision method, and suggested that this technique reduces professional isolation. This study worked with 21 urban teachers. (Archer, 1990) This study starts from the assumption that "to reduce isolation, teachers must work with one another. ... [and that] Teaching is a lonely, isolating profession." (Archer, 1990, p. 8) This study proceeded to implement a development project with the intent of helping teachers to work together. Archer found that "Each partner must have the opportunity to observe the other. Unless this occurs, then peer

clinical supervision rapidly becomes a process that is <u>done to</u> certain categories of teachers, such as new teachers, weak teachers, or inexperienced teachers." (Archer, 1990, p. 73)

In a study of peer reflection (teachers observing other teachers), Potter remarked that teachers' difficulties include professional isolation. This study worked with 3 teachers. (Potter, 1991)   Potter's major conclusion is that teachers were unwilling to seek out or offer feedback and critique, and that they did not enjoy being observed. My overall impression of this study is that it is a weak method-driven study. The introduction and literature review repeat themes seen elsewhere.

Smith investigated the nature of peer consultation as it was actually practiced. Smith found that, in part, teachers engage in the technique of peer consultation in order to reduce professional isolation. This study used 104 interviews and 79 questionnaires. (Smith, 1989)   One of the more interesting parts of this study is an extensive comparison of peer consultation to other forms of peer observation. Towards the end of this section, Smith comments that "the types [of peer observation] that focus on group development, goal setting and problem solving appear to have caused more long-term change. Programs that focused on the individual and pairs of teachers, without a larger forum for sharing educational issues, seemed to be less powerful than those that encouraged group feedback sessions and group decision making." (Smith, 1989, p. 81) This observation is compatible with the theory of the community of practice: that teachers not only need to work with each other, but they also need a means of communicating that work to a larger audience.

Stevens worked with 3 beginning teachers to, in part, ascertain the influence of professional isolation on their developing perceptions of teaching. (Stevens, 1992) "Isolation is the one element of alienation which appeared to be dominate in the perceptions of teaching by the subjects of this study." (Stevens, 1992, p. 128) One particularly isolating administrative procedure described in the study is a policy known as "Reduction in Force (RIF)". RIF, at this school, is a process by which all non-tenured teachers are fired for the coming year in the middle of the current year, even though the administration knows it will hire almost all of them back before the end of the current year. This policy appears to be a response to non-timely state budgets.

Summary of literature review

The uses of the literature reviewed for this study can be summarized in five ways.

First, the literature review allowed a wide range of potential sources of professional isolation and connection to be collected and organized into a single framework.

Second, the literature review highlighted the theme of 'community' which serves as a context for the study of professional isolation and connection. For instance, the category of community was found in literature on exemplary teachers but was missed by the pilot study participants. This suggests that elements such as community and the connections which make community possible, which are critical to schools'

and teachers' success are not necessarily recognized by school participants through their day to day observations. Thus, effort which makes school participants aware of the value of community and its attendant connections is likely to pay dividends. The Professional Development School is an organizational form whose emphasis on reflection has helped its school participants see the value of community. A professional development school, as a multi-institution partnership, would be in a good position to facilitate access to computer technology which can be used to create community, through both technical and social dimensions, as can be seen in the literature associated with network learning.

  Third, the major concepts from the various literature review sections can be recombined as a way of providing a further context for the study. For instance, community and social networks; and reflection and communication are just two of the ways that the major concepts found within the literature on exemplary teacher research, professional development schools, network learning, and professional isolation can be recombined to set the context for this study. When these concepts are recombined, it can be seen that the sense that a community exists to which it is possible to belong, can not be made real without specific connections between people. The full benefits of reflection can not be brought to fruition without the means to communicate that reflection. It is my hope that the research presented herein will aid teachers by enhancing their ability to communicate, and thus will help spur the whole education community to realize its potential to be exemplary.

Fourth, from a methodological point of view, the literature review was critically important as I was refining both the main idea behind the study and the questions I wanted to ask. The literature review of professional isolation convinced me that it would be a valuable contribution to the field to do a study with a different type of design than had been done on this topic previously. I had difficulty finding an example of a survey type study which was a good fit with the questions I wanted to ask, so I sought out relevant, expert help to refine the survey design. This included extensive consultations with my committee, other faculty, fellow graduate students, a group of principals and teachers, a statistical consultant who specializes in survey research, and extensive pilot testing of the survey. Since statistics is not my specialty, I sought out expert statistical consultants who could advise me on the appropriate tests to use with the kinds of data I needed to analyze.

Fifth, the literature can be seen in relation to the theory behind the study. Reduced to its most basic level, the theory describes how people learn, and how teaching can facilitate that learning. Exemplary teacher research describes how exemplary teachers learn and how they teach. This research is capable of both confirming and refining the theory (Gerber, 1992). Professional development schools can serve as organizational structure which facilitates teachers finding coaches to help them develop. Such coaches could be university faculty or other experienced teachers. Network learning can provide access to meaningful learning materials, as indicated in Principle of Meaningful Learning Number 9 ("Meaningful learning requires: (1) a disposition (set) to learning meaningfully; (2) meaningful learning materials; and (3) some relevant knowledge") (Novak, 1995). The

social aspects of network learning can facilitate the development of "a disposition to learn meaningfully." Network learning can provide teachers with access to a larger range of potential coaches than may be available locally. The autonomy that some teachers have described as a by-product of professional isolation can be positive in that it would allow teachers to own the "relevant background knowledge" that they need in order to learn and teach effectively. By having to work out the relationships between ideas for themselves, each teacher can have a more secure grasp of their subject matter than if the subject matter had just been handed to them as a series of facts and formulas to be memorized. On the other hand, professional isolation restricts access to potential coaches who could help each teacher develop. The goal of this study is to help the education community find ways to assist teachers' development while preserving teachers' opportunities for autonomous learning.

Chapter 3 - Methodology

Theoretical Grounding of the Study - Meaningful Learning

  Meaningful learning is an approach to education which is grounded in a theoretical understanding of the processes which occur within and around the learner. (Novak, 1977)

  Meaningful learning includes the philosophy that learners construct understanding. This construction is most powerful when it builds upon a student's previous understanding. Meaningful learning is also a philosophy of optimism. People who work with the Meaningful Learning approach to education believe that every student has the ability to learn, and that this belief in the student's ability is a necessary precondition for that learning. As a corollary of this optimism in students, there is an optimism in teachers. Given adequate support, all teachers have the capacity to become effective, and even exemplary, teachers. Thus, for both teachers and students, meaningful learning supports education which connects present learning to both previous learning and future learning. The richer these connections are, the more powerful the education will be. Many of the underlying ideas of meaningful learning seem obvious. The fact that meaningful learning is not as widespread as it ought to be is likely due to the corrolary that the attainment of long term results require teachers and students to plan, think, and work.

  Education must be consistent with the biology of the brain, although current understanding of how the brain processes and stores information is

very incomplete. Much of meaningful learning to date as been developed from the tradition of educational psychology, with much of this focusing on the cognitive aspects of education. Nonetheless, the social component of education is also critical and deserves to be described in more detail, which this dissertation attempts to do. Meaningful learning can best be summarized by examining Novak's Principles of Meaningful Learning (See Appendix E).

Sampling

Pilot Samples

This study utilized two pilot samples.

The first version of the survey was sent to 600 teachers in one region of the California High School Teachers Network. The results from this sample were used to refine the survey. Principally, sources of isolation and connection were suggested in these surveys which were added to Questions 1 and 2. Some questions which appeared to be confusing or which did not seem to be absolutely critical to the study were removed from the survey. The low response rate to this first sample, 12 out of 600, was a major impetus to developing a tighter response rate strategy.

A version of the survey which had been modified based upon the first sample, as well as based upon the public discussion[8], was administered to an

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[8] An extremely valuable process where the graduate student presents the dissertation proposal to his committee, invited guests, and any members of the Education Department who choose to attend.

advanced cohort of Cornell teacher education students. This sample was

utilized primarily to time how long it took to fill out the survey (a

component of the response rate strategy), as well as to check if any of the

questions were confusing. Timing how long it took to fill out the survey

was suggested during a statistical consultation. (Schwager, 1995)

   Main Sample

   I exhaustively sampled the high school science teachers in the four

BOCES[9] regions around Cornell (Tompkins-Seneca-Tioga, Schyler-

Chemung-Tioga, Cayuga-Onandaga, and Wayne-Finger Lakes). These

BOCES were chosen because their geographic proximity made them easier to

work with. They have a generally rural character, though not uniformly so.

They also do not include any large cities, specifically Binghamton, Syracuse,

or Rochester. A truly comprehensive study of professional isolation would

include such urban regions, but the complexity of the sampling would jump

by an order of magnitude, so I decided to leave those areas for a future study.

   I decided to conduct an exhaustive sample, rather than a randomly

selected sample of school districts, so that I could avoid the potential

problem of teachers in non-selected schools feeling left out of the study. I

also wanted a relatively compact region so that I could visit as many schools

as was feasible. I offered to visit the schools in person in order to distribute

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[9] BOCES stands for Board of Cooperative Educational Services. BOCES is a system of special multi-school district districts which cover most of New York State, the primary exception being New York City. These BOCES districts provide special services to their member schools and communities.

the surveys. Several schools took me up on this offer, and some of the teachers from these schools filled out the surveys while I was there. This enabled us to have a conversation about the study. This was valuable both as a source of data, and more importantly, it was valuable in that it made the research process more personal. Finally, by using an exhaustive sample, I have a stronger justification for including all data points when using teachers as the unit of analysis, even when intra-school response rates are below 50%, because under those conditions the important response rate would be the total response rate of teachers. In other words, this minimizes, though it does not completely eliminate, the possibility that respondents from schools with less than a 50% intra-school response rate are atypical, such as being the "best" teachers, or the principal's favorites.

I chose high school science teachers not because I felt they were any more or less isolated than other teachers, but because I needed to limit the population to a reasonable number. Since the Meaningful Learning Research Group, headed by Dr. Joseph Novak and of which I am a member, has a long standing focus on science education, and has worked with high school science teachers (such as CIRBM[10]), I felt that choosing high school science teachers was consistent with our previous work.

There are 310 high school science teachers in this region in 52 schools. One school in this region does not have any high school science teachers, and was therefore not included in the study. This school has generalist teachers only, and is an anomaly in a number of other ways.

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[10] Cornell Institute for Regional Biology Mentors.

Response Rate Strategy

I worked with the Superintendent of the TST-BOCES[11] to recruit principals to join my collaborative partners group. I was originally going to create a cover letter to the survey cosigned by this group, but since they thought this was not necessary, I did not. Still, the backing of this group gave me very good access to their schools, and allowed me to refer to the group when necessary to show that this study had the interests of the schools at heart. This group gave me valuable advice which was incorporated into the survey.

I wrote a letter on Education Department stationery to either the School District Superintendent, or the High School Principal. I then followed up this letter with a phone call to secure permission to send my surveys to that school. In some cases, I received permission immediately. In other cases, the contact person requested a copy of the survey to review. In such cases, I would make a follow up call to the contact person, and usually secured permission at that point. Only 10% of the schools decided not to participate at all.

Simultaneous with the above steps, I contacted the Vice President of Tom's of Maine, a natural personal health products company. I had met the

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[11] The Tompkins-Seneca-Tioga Board of Cooperative Educational Services is a non-profit cooperative owned by and operated for the benefit of its member school districts. The organization provides professional development services, vocational education, and community education. In addition, its facilities are used by a variety of community groups as a place to hold their programs.

Vice President at a conference some months before. I eventually was given some 300 50¢ coupons good for any of their products. I included one coupon with each survey packet as a small token of my appreciation for the teacher's participation. This does not represent complete reciprocity, but it was the best I could do in the context of a self financed study, especially since, as a graduate student, offering to pay the teachers for their participation might have seemed inappropriate.

I prepared packets with the cover letter/instruction sheet, the consent form, the survey, an optional follow-up sheet, two pre-addressed and stamped envelopes, and a Tom's of Maine coupon all paper clipped together. I sent the appropriate number of surveys off to each school with a cover letter on stationary addressed to the contact person reminding him or her that I was grateful for their participation, and would be happy to provide assistance to the science department, such as computer help, if they could use such help.

Towards the end of the semester, I made some follow up calls, and then resent enough surveys to the contact people for the number of teachers in their respective schools who had not sent in the survey the first time and may have misplaced the first copy. This was possible because when I first contacted each school, I found out how many high school science teachers they had. The surveys were coded so that I could identify the school the survey was from, but could not identify the individual teacher.

Confidentiality

Each survey packet included a standard consent form explaining what kind of information might become public, and what kind of information would definitely not be revealed. Because I wanted to ensure that it would be impossible for me to match up surveys with specific people, I provided two return envelopes so that the consent form could be sent in separately from the survey itself. That way, in the unlikely event that my data was subpoenaed in a court case, I could legitimately claim there was no way to identify people from the data. This was probably overkill, and it did drive up my costs, as well as adding a little extra complexity in that teachers had to figure out what to do with all of the paper that they were sent, but it seemed like a reasonable thing to do at the time.

I also did not ask for ethnicity data in the Background section of the survey in part because in small rural schools, such data might be especially identifying. For the same reason, I included a Highest Educational Level Attained question with a category which included PhDs (Masters+30 hours or more) without forcing people to explicitly identify themselves as such if they didn't want to.

Statistical Analysis

SPSS was used to perform statistical analysis on the quantitative data.

Statistical techniques used include exploratory data analysis, such as histograms, bar graphs, and rank by mean tables. The Chi-Square test was

used to test for statistically significant differences and similarities in Boolean data when the data was broken down by gender, and experience (as represented by years of full time teaching experience, and highest educational level attained). The One Sample t-test was used to test for statistically significant differences in count data.

Survey Design

Use of a 'bias sweeper' question

The survey clearly shows that I think that professional connection is a good thing. I wanted a way of countering this bias. Question 8, "Has isolation ever been a positive influence for your teaching? If yes, please describe the circumstances.", was intended to serve this 'bias sweeper' function. In other words, Question 8 gives the participant a direct opportunity to disagree with one of the study's fundamental assumptions. The question is a bias sweeper because it acknowledges my bias and provides a mechanism to "sweep up" observations which the main thrust of the survey might miss. This approach is consistent with subjectivity as a positive factor in research methodology. (Peshkin, 1988)

Survey as Interview

There are several ways in which the written survey used in this study functions as an interview.

First, Questions 1 and 2 were derived from teachers' experiences, either through reading the literature, talking to teachers, or through teachers suggesting additional categories during the pilot samples.

Second, the survey selectively probes the teachers' experience by having a series of open-ended questions which parallel the first three likert-type questions. Finally, the survey allows teachers who would be interested in participating in further portions of the study to identify themselves, thus allowing one study to be both comprehensive and in depth.

Qualitative Data Analysis - The Five Commonplaces of Education as Category System

"In 1963, Joseph Schwab proposed that education involved what he called "four commonplaces." His "commonplaces" were learner, teacher, subject matter, and social matrix. Each commonplace was necessary to consider and could not be "reduced" into one of the others (analogous to finding the lowest common denominator in fractions). Schwab's commonplaces have proven to be of value to educators. Our studies in schools and other settings, however, have shown that so much of what happens in teaching and/or learning depends upon the tests used that I wish to propose evaluation as a fifth element in education. ... I add the latter because so much of what happens to people in life is based upon evaluation. For better or worse, the evaluations we are subjected to determine whether or not we can drive an automobile, graduate with "honors" or enter a university or graduate program. Therefore, I see evaluation as an additional key element in education." (Novak, in press)

Edmondson's work provides an example of evaluation impacting learning. "Many factors govern the development of students' epistemological commitments, as well as the development of their orientations to learning. As noted above, the ways in which students are taught carry implicit messages about the nature of knowledge and their capabilities as generators of that knowledge. These effects are highly influential and long lasting. The extent to which they are encouraged to ask questions, the form of evaluation imposed upon them, and the extent to which they are encouraged to integrate what they learn all make significant contributions to their conceptions of learning and knowledge." (Edmondson, 1989, p. 192)

The five commonplaces of education is a powerful idea because it foregrounds that which is important in education with a simplicity and elegance. The obviousness of the five commonplaces does not diminish their power. By categorizing participating teachers' responses to the open ended questions in this study, the reader can easily obtain an understanding of the nature of professional isolation and connection from each of these five critical perspectives.

Issues Relating to Demographic Questions

On the recommendation of a researcher who regularly works with national educational data collection efforts, I asked for "Year of Birth" rather than age, because it is the same information, but in a form that many people regard as less sensitive. See the confidentiality section for discussion of other demographic question issues.

Problems related to the concept of Autonomy

While this study primarily looks at the dyad of isolation and connection, the earlier studies of professional isolation looked at isolation versus autonomy. There was no way to include a question directly on the concept of autonomy without making the survey too long, especially since I had already pared the survey down as much as I felt I could and still retain a logically complete set of questions. To adjust for this, I included both "Autonomy" and "Lack of Autonomy" in both Questions 1 and 2. As a result, if these were important to professional isolation, teachers could talk about them in Questions 4 and 5 if they chose to. As it happened, Question 8 ended up successfully soliciting responses relating to autonomy.

Conflicting nature of quantitative and qualitative research objectives

As my study design has increasingly evolved from a purely qualitative to a hybrid qualitative/quantitative study with an important quantitative component, I have increasingly realized that there are some fundamental assumptions which underlie qualitative research methodology which are substantially at odds with the fundamental assumptions which underlie quantitative research methodology. The heart of this conflict lies in the question of what does "generalizability" mean. In quantitative methodology, generalizability means that the results are representative of the population. In qualitative methodology, generalizability means that those results which achieve conceptual saturation legitimately exist in the population and that they are important to the population.

This methods conflict has manifested in this study because representativeness and saturation have different standards for acceptable sample sizes and response rates.

In other words, part of my study needs to be representative. This drives up the total number of surveys I need to send out. It also drives up the acceptable response rate. On the other hand, because long, open ended responses are critical to the kind of data I think will ultimately be necessary to interpret the shorter length questions, the survey becomes long and the acceptable response rate becomes increasingly difficult and expensive to achieve. But back to the first hand, if I shorten the survey so that the response rate is simple to achieve, I lose the core of the data that I think will be crucial to understand professional isolation.

To resolve this conflict, I developed a two part survey design. The first part contains both short answer questions which are conducive to achieving a high response rate, and open ended questions which give in-depth responses but which are not so extensive that they would seriously impair the likelihood that the survey would be filled out at all. The second part consists of an optional follow up sheet in which a teacher has the option of giving me permission to send the teacher some open ended follow up questions. This would allow for more in-depth probing responses, but would preserve the elegance of the study because both parts of the survey would be sent to the same population. Forty-seven teachers representing at least twenty-eight schools sent in a follow-up sheet indicating a potential willingness to participate in additional portions of the study. This represents 15% of the high school science teachers in the region of the study,

and 38% of the teachers who participated in the study. To date, I have not
been able to send out this second part, although I intend to do so eventually.
Results from such a second part, of necessity, will be reported elsewhere.

Chapter 4 - Context of the Study

Response Rate

The overall response rate was 124 out of a possible 310 teachers, or 40%.

This includes an oversample of 2, or 0.6%. The oversample consists of teachers who are science teachers, but who teach only middle school and do not teach high school. The oversample was obtained because some principals wanted to give the survey to all of their science teachers. It seemed reasonable to include these responses in the results because these teachers are currently very close to the target population, and they easily could become a member of the target population in the not too distant future.

The response rate relative to schools who agreed to participate was 124 out of a possible 280, or 44.3%.

The response rate relative to schools which had at least one survey returned was 124 out of a possible 249, or 49.8%. This response rate includes one teacher who responded by returning the survey unmarked with a note that said "I respectfully decline to answer this survey". If this unmarked survey is not counted, the response rate relative to schools which had at least one survey returned is 123 out of a possible 241, or 51%. Since the unmarked survey was the only response from that particular school and since it is difficult to aggregate data from a school when there is no data from that school, I decided to conduct data analysis without the unmarked survey. I have included this survey in the total response rates above since

the blank but returned survey represents the maximum response it would have been possible to get from this particular teacher, short of using unreasonable response rate mechanisms: you can't hold a gun to people's heads and expect to get valid data.

The 123 surveys referred to above represent 76.5% of the schools in the region, or 39 out of a possible 51 schools. These schools have an average intra-school response rate of 58.9%, which means that the intra-school response rate is slightly skewed towards schools with smaller science departments. This number is also slightly skewed by the oversample, which allows one school to have an intra-school response rate of 125%.

I believe that I have made all reasonable efforts to ensure as high a response rate as was possible. See Chapter 3 for a detailed discussion of the steps taken. Since the response rate for the 39 responding schools exceeds 50%, I would argue that the results are representative for those schools.

The dissertation proposal suggested a minimum response target of 24 schools with a minimum 50% intra-district response rate. Actual results have 23 schools who meet this target, with seven schools which need one more response to put them over the 50% threshold. Alternatively, there are 24 schools with a minimum intra-school response rate of 42.8%, an average intra-school response rate of 77.4% and an average response rate by teachers in those schools of 72.7%, or 88 out of 121.

Assuming that the survey took 15 to 20 minutes to fill out, and assuming that a teacher's average hourly pay is $25, then the results of this study (123 responses) represent between $768 and $1025 of the participants' time, not

counting the value of the contact people's time in handing out the surveys. This shows that it would have taken approximately $2500 to pay for a 100% response rate (although the actual cost would probably be higher because the marginal cost of obtaining participation from each $(N + 1)$th teacher is likely to increase as the achieved response rate increases). As a rule of thumb, these cost estimates show how inappropriate it would have been for me, as a graduate student, to try to pay for the teachers' participation. At one point I had considered paying for the teachers' participation, but my collaborative partners group advised me not to do so. These cost estimates also show how much a well organized and well funded project would need to ensure a high response rate to a survey which attempts to achieve quantitative and qualitative research objectives.

Characteristics of the Region Sampled

The region in which the main sample was conducted consists of four contiguous BOCES districts. This region has 49 school districts with 51 high schools.

The region has an area of 3927.85 square miles. The mean district size is 81.8 square miles, with a standard deviation of 40.23 square miles. One of the districts is a special district whose area is subsumed under one or more other school districts. Therefore, Figure 1 has an N of 48.

The region has a total student enrollment in all grades of 95,435 students. The mean total student enrollment is 1988.2 students, with a standard deviation of 1530.74. (NY-SED, 1995)

The mean enrollment/square mile is 33.5 students/square mile with a standard deviation of 34.54. As can be seen from the following Figure 1, this is a very skewed and bimodal distribution. This distribution provides confirmation of the relative ruralness of the region under study.
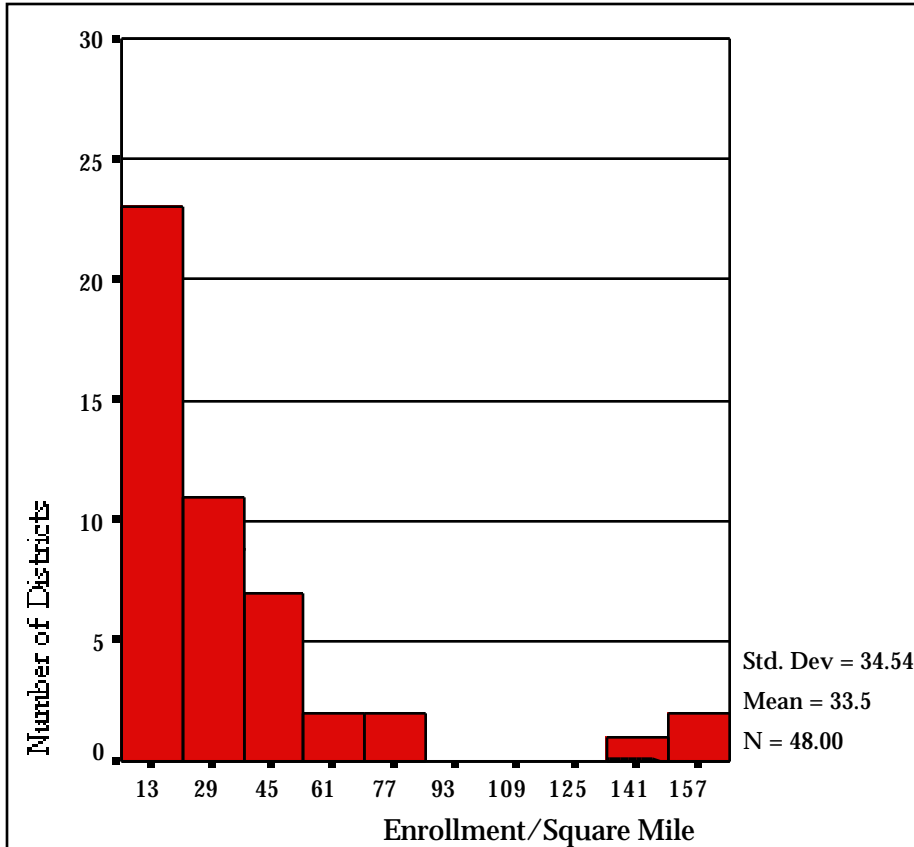
Figure 1: A histogram showing the distribution of total school district enrollment per square mile by school district.

The region has a mean of 0.11 high school science teachers/square mile, with a standard deviation of 0.09. Half of the teachers teach in districts with less than 0.097 high school science teachers per square mile, while the other half teach in districts with between 0.097 and 0.5 high school science teachers per square mile.

Two of the districts have two high schools. All of the other districts have one high school.

The mean number of high school science teachers per district is 6.3 teachers, with a standard deviation of 3.68.

Characteristics of the sample

Of the teachers who responded to the survey, 77 were male, 40 were female, and 7 did not indicate a gender. Since 32% to 38% (if all seven teachers who didn't indicate a gender happened to be female) of the participants were female, and women comprise 39% of the high school science teachers in the state of New York (of the 11,451 high school science teachers in the state, 4,466 were women in the Fall of 1995) (Caruso, 1995b), the results of this study should be fairly representative of gender issues.

The mean of the Teachers' year of birth was 1951.8, with a standard deviation of 8.59. A histogram showing the distribution is below (Figure 2).
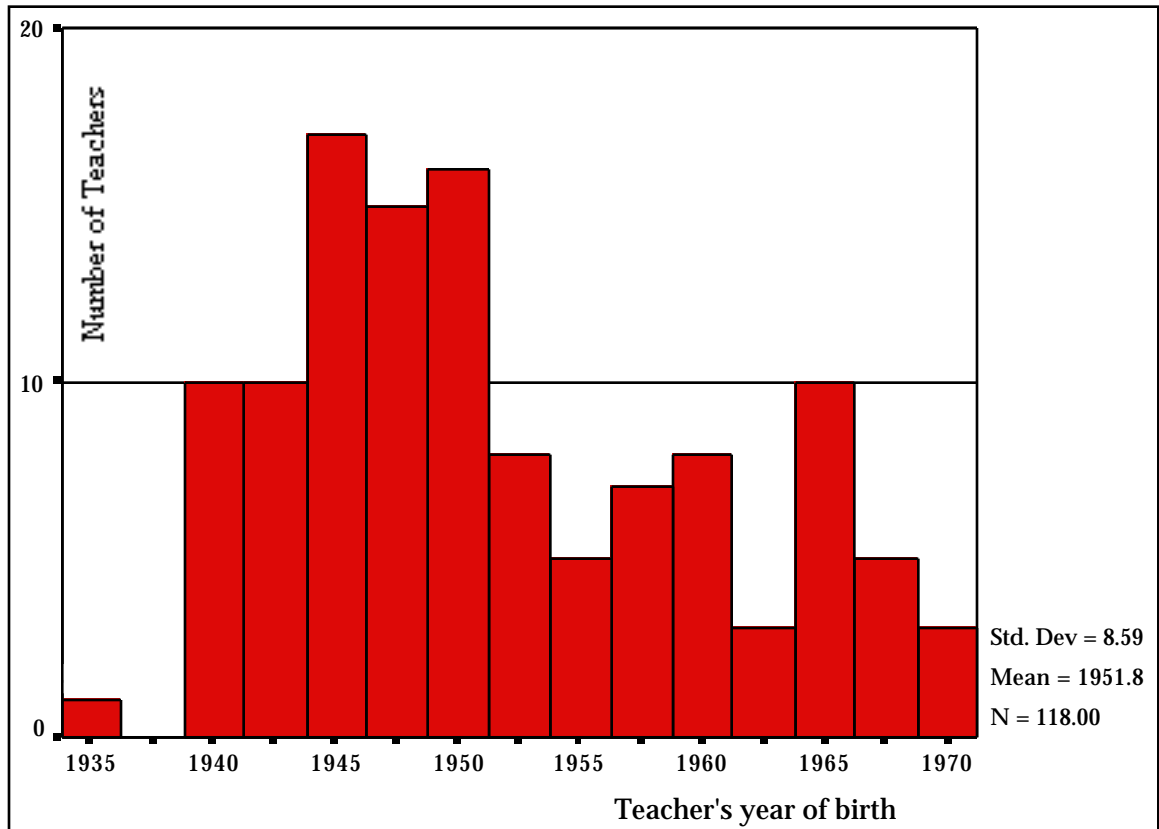
Figure 2: A histogram showing the distribution of participating teachers' year of birth.

This distribution can be compared to the distribution of all science teachers in New York State. The data in column B of Table 3 is from Table 6 in the New York State Education Department's Public School Professional Personnel Report 1995-96, "Age Distribution of Public School Professional Personnel by Professional Field 1995-96" (NYSED, 1996).

Table 3: Participating teachers' age distribution compared to that of all science teachers in New York State.

Age	Percent of Responding Teachers in this study (A)	Percent of All Science Teachers in New York State (B)	Over/Under-representation (A-B)
Over 64	0.0%	0.4%	-0.4%
57-64	3.4%	4.7%	-1.3%
49-56	35.6%	29.6%	6.0%
41-48	29.7%	29.6%	0.1%
33-40	16.1%	17.8%	-1.7%
26-32	15.3%	13.9%	1.4%
Under 26	0.0%	4.0%	-4.0%

This data (Table 3) has been represented as a graph in Figure 3. As can be seen from Figure 3, the participating teachers slightly overrepresent the statewide population of science teachers in the 49-56 year old category, and slightly underrepresent the statewide population of science teachers in the Under 26 year old category, but otherwise the two distributions are very similar.
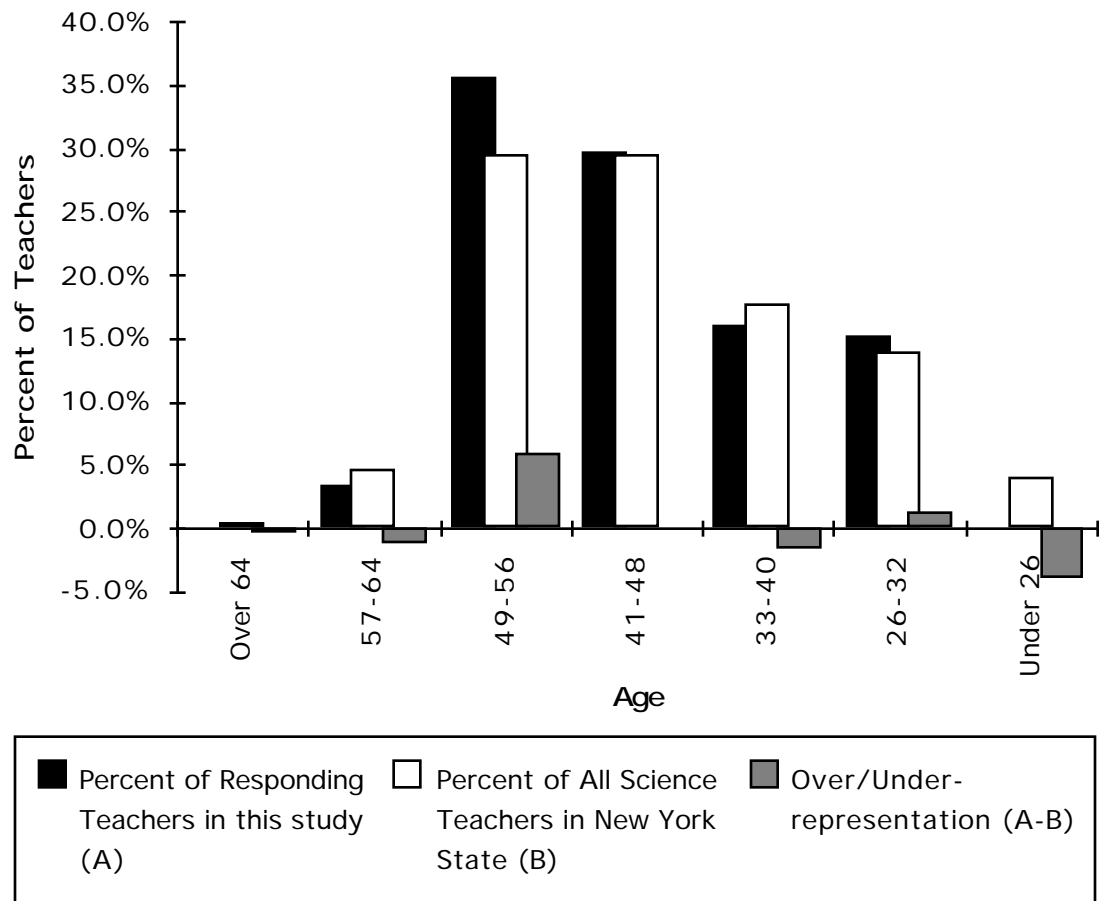
Figure 3. Participating teachers' age distribution compared to that of all science teachers in New York State.

There were 26 teachers in this study with a highest educational level attained of BA/BS, 40 teachers with a Masters, 51 teachers with Masters+30 hours or more, and 7 teachers who left the question blank.

Table 4: Participating teachers' distribution of highest educational level attained compared to that of all science teachers in New York State.

Highest Educational Level Attained	Percent of Responding Teachers in this study (A)	Percent of All Science Teachers in New York State (B)	Over/Under-representation (A-B)
BA/BS	22.2%	26.0%	-3.8%
Masters	34.2%	35.1%	-0.9%
Masters+30 hours or more	43.6%	38.9%	4.7%

As can be seen from Table 4, the participating teachers slightly overrepresent the Masters+30 hours or more category, and slightly underrepresent the BA/BS category. Data in Column B of Table 4 was derived from Table 3 "Degree Status of Public School Professional Personnel by Professional Field New York State 1995-96" (NYSED, 1996) by combining the categories "Bachelor's or Less" and "Bachelor's + 30 or more Hrs." into the BA/BS category, and combining "Master's + 30 or More Hrs." and "Doctorate" into Masters+30 hours or more.

The mean of Teachers' Years of full time experience is 17.2, with a standard deviation of 10.33. The distribution appears to be bimodal. A histogram showing this distribution is below (Figure 4).

Std. Dev = 10.33
Mean = 17.2
N = 115.00
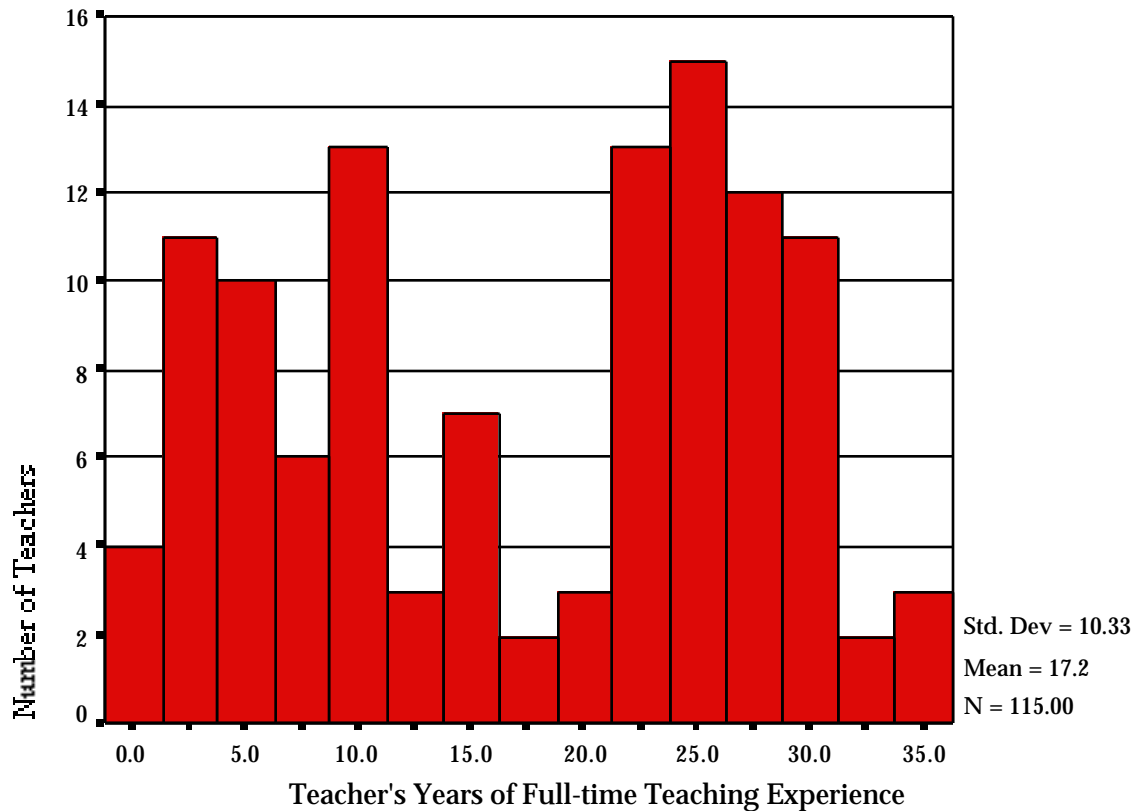
Figure 4: A histogram showing the distribution of participating teachers' years of full-time teaching experience.

Table 5. A comparison of the years of full time teaching experience of teachers in this study to all science teachers in New York State.

Percentiles of Teachers	Responding Teachers' Years of Full Time Teaching Experience in this study (A)	All Science Teachers in New York State's Years of Full Time Teaching Experience (B)	Over/Under-representation (A-B)
25th Percentile	8	8	0 years
50th Percentile	20	18	2 years
75th Percentile	26	27	-1 years

As can be seen from Table 5, teachers' years of full time teaching experience is nearly identical at the 25th, 50th, and 75th percentiles of both populations.

In response to the question "What grades do you teach?", 7 teachers left the question entirely blank, 4 teachers indicated that they teach Grade 6, 15 teach Grade 7, 14 teach Grade 8, 56 teach Grade 9, 73 teach Grade 10, 59 teach Grade 11, and 65 teach Grade 12.

In response to the question "What subjects do you teach?", 52 teachers indicated that they teach Biology, 29 teach Chemistry, 37 teach Earth Science, 31 teach Physics, 6 indicated their subject as "science", 5 teach Environmental Science, and 4 teach General Science. Several other types of science were mentioned, each of which had only one response.

Table 6. The distribution of subjects taught for participating teachers compared to all science teachers in New York State.

Subjects Taught	Percent of Responding Teachers in this study (A)	Percent of All Science Teachers in New York State (B)	Over/Under-representation (A-B)
Biology	34.9%	42.2%	-7.3%
Chemistry	19.5%	16.5%	3.0%
Earth Science	24.8%	21.9%	3.0%
Physics	20.8%	19.5%	1.3%

As can be seen from Table 6, the percent of teachers in this study who teach each of the four major school science subjects is quite similar to the percentages for all science teachers in New York State. The data in Column B of Table 6 was derived from Fall 1995 data on the count of teachers in all science subject areas provided by Mr. Peter Caruso of the New York State

Education Department (Caruso, 1995a). It should be noted that subjects taught data from participating teachers was sometimes specified by general subject (such as "Biology") and sometimes by specific subject (such as "Regents Biology"). The data was reduced to the general subject areas. Teachers can be counted more than once if they teach multiple general subjects, but were only counted once even if they listed more than one specific subject within a general subject (such as "Regents Biology and Local Biology"). In contrast, the New York State Education Department data is very specific. For classes which can be taught in Grades 7-12, this data shows 10 kinds of Biology, 7 kinds of Chemistry, 5 kinds of Earth Science, and 8 kinds of Physics. A teacher who teaches multiple kinds of each of these general subjects would be counted multiple times. Thus, if the likelihood of teachers to teach multiple kinds of each general subject is the same for all four general subjects, the data from the New York State Education Department and the data from this study should be comparable with a high level of confidence. If the above likelihood is not the same for all four general subjects, the data is less comparable. With that caveat in mind, the distribution of subjects taught among participating teachers is very close to that of all science teachers in New York State.

Chapter 5 - Results and Analysis

   This study was an attempt to answer the following question. Where does Professional Isolation and Connection come from, are there differences in how different teachers experience it, how do teachers get from isolation to connection, and are there ever reasons to not want to make the trip?

What is the range of sources of professional isolation and connection which teachers experience?

   Through the literature review, as well as consultations with teachers and administrators, the list of items that appear in Questions 1 and 2 were developed. While if I were to do this study again, I would make some modifications to the lists based upon teachers' responses, my sense is that the lists used for this study are fairly complete.

What sources of professional isolation and connection are most prevalent, as experienced by teachers?

   I have divided the sources into most frequent sources, niche sources, and infrequent sources (See Tables 7 and 8). The cut-offs for each category are derived by taking the source with the highest response and dividing by three. Thus, for sources of professional isolation, most frequent sources are those where 40.1% or more of the teachers marked "major", niche sources are those where between 40.0% and 20.0% of the teachers marked "major", and infrequent sources are those where less than 20% of the teachers

marked "major". For sources of professional connection, most frequent

sources are those where 25.7% or more of the teachers marked "major",

niche sources are those where between 25.7% and 12.8% of the teachers

marked "major", and infrequent sources are those where less than 12.8% of

the teachers marked "major".

Table 7: Sources of professional isolation ordered by the percent of teachers
who indicated that a given source was a major source of isolation. This
percent is relative to the number of valid responses for each item.

Source of Professional Isolation	Number of teachers who marked "Major"	Number of valid responses for each item	Percent of teachers who marked "Major"
Most Frequent Sources			
Lack of time	74	123	60.2%
Paperwork	57	122	46.7%
A feeling that as a teacher you are overworked	51	122	41.8%
Lack of money	51	122	41.8%
Niche Sources			
Community Attitudes	42	122	34.4%
A feeling that administration does not nurture or care about teachers	37	121	30.6%
Lack of trust (between teachers and teachers or administrators)	34	122	27.9%
Lack of teacher-teacher collaborations	32	122	26.2%
Being the only teacher for a subject matter in your school	32	122	26.2%
Lack of computer networks	30	122	24.6%
Lack of informal teacher networks or support groups	29	122	23.8%
Lack of university courses for teachers offered at your school site	28	122	23.0%
Limited professional dialogue, such as teachers talking to each other about administrative problems, but not about their subject matter	27	121	22.3%
Differences in educational philosophy	25	122	20.5%

Table 7 (Continued)

Infrequent Sources			
Lack of planning periods	24	122	19.7%
Lack of successful orientation or mentor program for new teachers	22	121	18.2%
Logistical problems	19	118	16.1%
Other teachers' lack of interest in trying new approaches	19	121	15.7%
The layout of your school's instructional space, such as teachers' spending most of the day in one classroom	19	122	15.6%
Staffing structure (such as lack of secretarial support for teachers)	18	122	14.8%
Family obligations	17	122	13.9%
Lack of peer observations (observing each others' teaching)	16	122	13.1%
Geographical distances	15	122	12.3%
Lack of substitute teachers	13	122	10.7%
Low participation in professional organizations	11	121	09.1%
The curriculum I am expected to teach	11	122	09.0%
Autonomy	8	119	06.7%
Lack of tenure or job security	7	122	05.7%
Boredom	5	122	04.1%
The attitude that the teacher is supposed to be an expert who shouldn't have to ask for help	4	121	03.3%
A feeling that my teaching job is a grunt job	4	121	03.3%
Inclement weather	4	122	03.3%
Gender	3	122	02.5%
Lack of autonomy	2	120	01.7%
Age	1	121	00.8%
Race	1	122	00.8%
Being a bilingual teacher or teaching bilingual students	0	121	00.0%

Table 8: Sources of professional connection ordered by the percent of teachers who indicated that a given source was a major source of connection. This percent is relative to the number of valid responses for each item.

Source of Professional Connection	Number of teachers who marked "Major"	Number of valid responses for each item	Percent of teachers who marked "Major"
Most Frequent Sources			
Friendship	47	122	38.5%
Niche Sources			
State or National conferences (STANYS, NAAEE, etc.)	31	121	25.6%
Teacher-teacher collaborations	27	122	22.1%
Family	24	122	19.7%
Tenure or job security	20	121	16.5%
Other teachers' interest in trying new approaches	20	122	16.4%
Informal teacher networks or support groups	19	120	15.8%
The curriculum I am expected to teach	19	121	15.7%
A feeling that administration nurtures and cares about teachers	18	121	14.9%
High participation in professional organizations	18	122	14.8%
Planning periods	16	122	13.1%
Infrequent Sources			
Similarities in education philosophy	14	122	11.5%
Autonomy	13	119	10.9%
Participation in a Professional Development School or Partnership	10	121	08.3%
The layout of your school's instructional space	10	122	08.2%
Community attitudes	8	120	06.7%
Computer networks	8	122	06.6%
Peer observations (observing each others' teaching)	7	122	05.7%
Money	6	121	05.0%

Table 8 (Continued)

Continuing communication with classmates from your teacher education program	5	119	04.2%
Staffing structure (such as secretarial support for teachers)	5	121	04.1%
Successful orientation or mentor program for new teachers	5	121	04.1%
Gender	4	122	03.3%
Geographical distances	3	119	02.5%
Lack of autonomy	2	117	01.7%
Teacher's aides	2	122	01.6%
Parents who volunteer in the school	2	122	01.6%
Age	2	122	01.6%
University courses offered at your school site	1	122	00.8%
Race	0	122	00.0%
Differences in educational philosophy	0	122	00.0%
Being a bilingual teacher or teaching bilingual students	0	122	00.0%

Most frequent sources of isolation and connection are those which education organizations can expect to find affecting many of the teachers they work with. Niche sources are those which affected fewer teachers, but enough teachers to constitute important sub-populations whose needs could be met by well designed programs. Infrequent sources affected very few teachers. They can be interpreted either as sources which have not had much impact in the past and therefore are not worth investing in, or as sources which have untapped potential.

A look at the most frequent sources of professional isolation suggest that teachers view themselves as resource poor. They have too little time to do too much work. Too much of that work takes time away from their main job: teaching. There is not enough money to get their job done properly.

The opportunity and the challenge for education organizations is to recognize that no matter how wonderful their program is, its adoption in the school will likely either displace existing work, or its adoption will occur in an unsustainable manner. Teachers will be stretched even thinner than they are now, and may eventually drop the program when their energy runs too low.

Thus, education organizations should consider how they can design their programs to be adopted without necessarily displacing equally valuable existing programs. For instance, if the education program asks the teacher to do extra research, the program should find a way to provide release time or to pay for extra teachers in the school so that the participating teacher's teaching load can be reduced.

There is only one frequent source of professional connection: Friendship. Friendship supports and sustains teachers. In the open ended portion of the survey, teachers commented on this friendship with reference to teachers in their own school, with teachers in other districts, and with former students.

The opportunity for education organizations is to find ways to facilitate the formation and maintenance of friendship through their programs. This could be as elaborate and expensive as inviting teachers back for a banquet each year. This could be as simple and inexpensive as encouraging the participating teachers to send each other holiday cards. This opportunity lends itself in an obvious way to projects which include teacher networks and support groups, but with a little creativity, opportunities for friendship can be found in nearly any project.

Sometimes that which is missing is as important as that which is common. Some previous work on professional isolation has started from an assumption that teacher's spending all day in one classroom is the main source of isolation. (Young, 1988; Zachmeier, 1969) This study provides evidence which contradicts that assumption. Only 15.6% of the teachers reported "The layout of your school's instructional space, such as teachers' spending most of the day in one classroom" as a major source of isolation.

What with all of the recent publicity about the internet, one might expect computer networks to be a major source of connection. This was not the case. Only 6.6% of the teachers reported computer networks as a major source of connection.

How have teachers experienced each source of professional isolation and connection?

Sources of Professional Isolation

Open-ended responses in Question 4 which correspond to each of the items in Question 1 were compiled and summarized. Since the intent of this report is to highlight just the major findings, only the responses relating to most frequent sources will be summarized here. It should be noted that the report of the number of teachers who responded to each item represents the number of teachers who chose to respond to that item in the open ended question, not the number of teachers who marked that item as "major".

Lack of time

Twenty seven teachers responded to this item.

One teacher wrote that "Time is the key to connecting as a father, teacher, [and] student." Isolation due to lack of time as described in Question 4 can be categorized into quality of time, scheduling, and non-school obligations. Some illustrative responses are shown below.

In addition to experiencing a lack of time overall, the quality of the time that is available to interact may not be of high enough quality to overcome isolation. This might be described as the conversational equivalent of being alone in a crowd. One teacher commented that "Work load and attending to needs of your students does not allow enough time to carry on continuous working relationships. I sometimes go weeks without having technical conversations with other colleagues. 36 seconds of 'do you know where the model is?' does not count as interactions." A second teacher remarked that "We are so busy during the day we may not even see each other, no less have time for productive exchanges." A third teacher wrote that "Time and energy are gone when things are planned for after school, [whether such things are] subject area teachers' picnics and get togethers, or informal workshops."

Teachers may have time to interact, but their schedules may conflict, thus preventing interaction. One teacher wrote that "When I'm free someone is busy. With so few teachers only a few of us can be free at any given time!" A second teacher remarked that "No special meeting time is set aside for us."

Many teachers have non-school obligations which cut into their ability to interact with each other. Teachers' non-school obligations include family, community interests, businesses, and farming. This is by no means to suggest that teachers should not have non-school obligations, or that they should devote less time to them. After all, as schools are asked to do more than just educate students, as schools are asked to play the role of a community agency, teachers' non-school interests and experience should be an asset to the functioning of their school.

One teacher wrote that "I personally have a business outside of my job as E. Sci. teacher. This entrepreneuring venture satisfies other aspects of life which are a frustration in teaching, i.e.: indifference, attitudes, reluctance to change, etc. Therefore, TIME is the quintessential element in professional collaboration."

A second teacher remarked that "Lack of time isolates me because I have a farm of 50 head, and also work my family's 150 head dairy farm mornings and weekends. Teaching is almost my R&R except for the mountains of homework."

Paperwork

Six teachers responded to this item.

Teachers spend "huge amounts of time on clerical work." This paperwork includes "1) attendance procedures, 2) assignments for missing students, 3) input to psychologist, etc., 4) calls to parents, 5) notes to parents, 6) others I

have probably not listed." Teachers "do paperwork until late every weekday."

   As an aside, it should be noted that teachers have been complaining about too much paperwork for a long time. One New York City teacher in the 1920s described the real job of New York City teachers as "highly paid clerks who were capable of teaching when the reports and other things give us requisite leisure." (Rousmaniere, 1994)

A feeling that as a teacher you are overworked

  Eleven teachers responded to this item.

   Participants feel overworked because they have too many students, too many assignments to grade at home, too many different classes to teach with not enough prep periods to prepare for them, too many roles (supervisor, secretary, committee member, teacher, counselor, advisor, coach, and more), and too much paperwork. Teachers have to work evenings, weekends, and holidays. On top of this, the administration wants teachers to create new methods for improved instruction, but gives no free time and little monetary support with which to create such new methods. As a result, teachers are often not able to connect and grow.

Lack of money

  Six teachers responded to this item.

One teacher wrote that "One of the first cuts in school budgets is conference money." Conference money or other types of connection may not even be in the budget because the administration does not aggressively pursue items that have cost involved. Sometimes conference money is included in the budget, but for administrators and not for teachers. Some teachers acknowledge that budgeting involves difficult choices, and "chose the things that enable program continuation or maintenance rather than enhancement/improvement." Sometimes teachers have science money frozen due to budget problems in other parts of the school.

Sources of Professional Connection

Open-ended responses from Question 5 which correspond to each of the items in Question 2 were compiled and summarized. Only the responses relating to most frequent sources, plus the second most frequent source, are summarized here.

Friendship

Sixteen teachers responded to this item.

"If my friends didn't support me and validate my work, no-one would."

Friendship supports and sustains teachers. Eight teachers commented on this with reference to teachers in their own school. Three teachers commented on this with reference to teachers in other districts. Three teachers talked about friendships with other teachers without specifying whether the other teachers were in their own school. One teacher talked

about the importance of friendship with former students. "Maintaining contact with former students provides one with essential feedback on the (+/-) points of the program I teach. Also, inspiration is instilled by their 'thanks' and future growth that they share with me."

State or national conferences (STANYS, NAAEE, etc.)

Eleven teachers responded to this item. Seven teachers mentioned STANYS in their response to Question 5, although teachers differ in their opinions of its overall effectiveness. One teacher remarked that "I find these conferences extremely valuable and use many of the ideas learned at the conference in my classroom." A second teacher observed that "The STANYS was a rejuvenating experience and gave a chance to vent our concerns with fellow teachers from all over the state. It doesn't accomplish much but opens the door for refreshing ideas - besides it being nice to talk to someone who does what you do." A third teacher stated that "Conferences are one thing that the school district supports so if you take advantage of this as I do in attending STANYS you can have two whole days of "connection.""

Diversity of Sources experienced

As can be seen from Figures 5 and 6 below, participating teachers have generally experienced more major sources of isolation than they have experienced major sources of connection. They are also more likely to have experienced no major sources of connection than they are to have experienced no major sources of isolation.
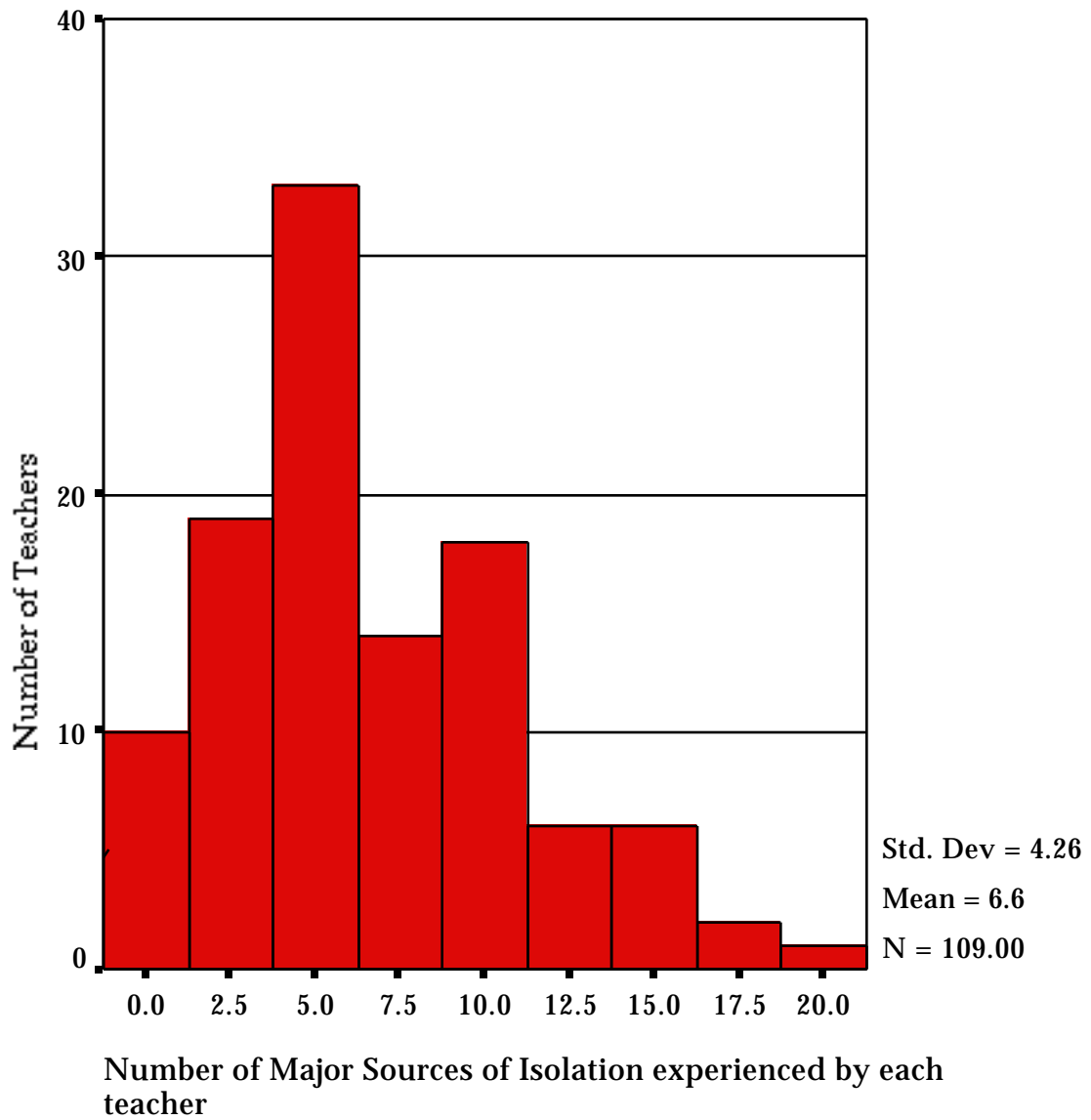
Figure 5: A histogram of the number of major sources of isolation experienced by each teacher.
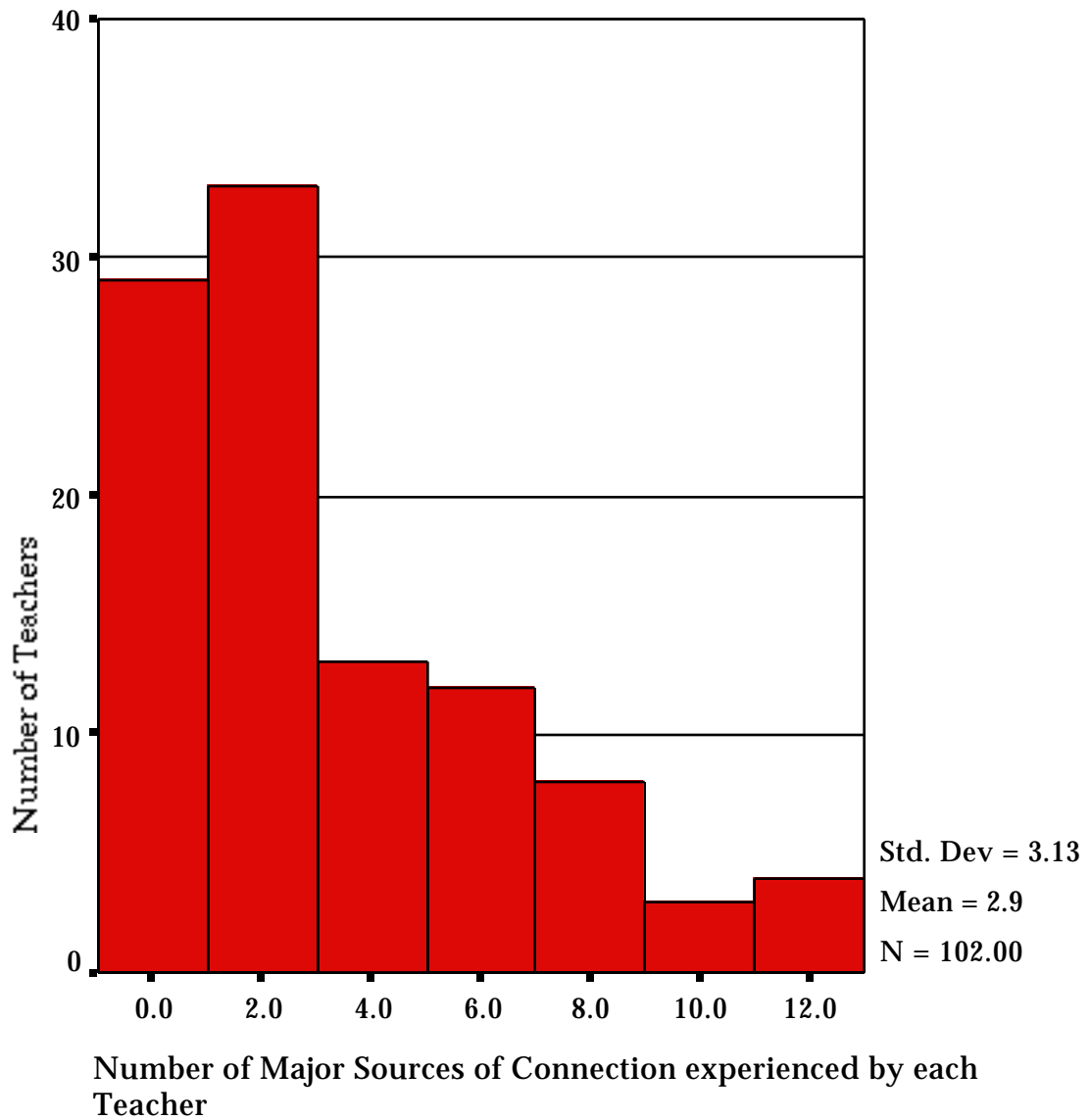
Figure 6: A histogram of the number of major sources of connection experienced by each teacher.

How isolated are teachers from other teachers?

   As can be seen from Table 9 below, the number of teachers whose relationships with colleagues are primarily characterized by connection are greater than the number of teachers whose relationships are primarily characterized by isolation. This is true in all categories except for "other school districts, but other subjects". In this last category, the number of teachers whose relationships with colleagues are primarily characterized by isolation are greater than the number of teachers whose relationships with colleagues are primarily characterized by connection. Cells with the most responses in each row are in bold.

   In Table 9, numbers in the Connection column represent the sum of teachers who responded "Strong Connection" and teachers who responded "Some Connection" in each item within Question 3. Similarly, numbers in the Isolation column represent the sum of teachers who responded "Strong Isolation" and teachers who responded "Some Isolation" in each item within Question 3.

Table 9: Comparison of the number of teachers who indicated that their relationships with other teachers are primarily characterized by connection or isolation, broken down by categories of teachers. This table reduces the data by combining teachers who indicated "Strong Connection" or those who indicated "Some Connection" into one category, while responses indicated by "Strong Isolation" or "Some Isolation" form a second category.

Category of teachers with which participating teachers have relationships primarily characterized by Connection or Isolation	Connection	Neutral	Isolation
my own school, and my subject	**91**	8	19
my own school, but other subjects	**94**	8	17
my own school district, and my subject	**61**	21	36
my own school district, but other subjects	**50**	24	44
other school districts, and my subject	**61**	12	46
other school districts, but other subjects	10	29	**80**

   As a first level of explanation, Table 9 indicates that teachers' reports of an element of their working conditions are better than I had expected, although there are still sizable numbers of teachers whose working conditions could be enhanced.

   When the data are examined in greater detail in Table 10 below, it becomes evident that there is still room for improvement by making the connections stronger. Numbers in bold indicate the highest number of responses in a row, while underlined numbers indicate the highest number of responses in a column. The numbers in Table 10 are simply the number of teachers who responded to each option in each item within Question 3.

Table 10: Comparison of the number of teachers who indicated that their relationships with other teachers are primarily characterized by connection or isolation, broken down by categories of teachers. This table uses all five original categories to show the distribution of the teachers' responses in full detail.

Category of teachers with which participating teachers have relationships primarily characterized by Connection or Isolation	Strong Connec-tion	Some Connec-tion	Neutral	Some Isolation	Strong Isolation
my own school, and my subject	**56**	35	8	9	10
my own school, but other subjects	24	**70**	8	11	6
my own school district, and my subject	17	**44**	21	16	20
my own school district, but other subjects	8	**42**	24	23	21
other school districts, and my subject	10	**51**	12	**26**	20
other school districts, but other subjects	1	9	**29**	15	**65**

While it is true that there are more teachers whose relationships are primarily characterized by connection than isolation, the proportion of those teachers whose relationships are characterized by connection relative to those whose relationships are characterized by isolation declines the farther away those relationships go from the teacher's own school. (Table 11) The numbers in Table 11 represent the Connection value found in Table 9, divided by the Isolation value found in Table 9 for each item in Question 3.

It should also be noted that while an analysis of Question 3 indicates that more teachers' relationships with other teachers are primarily characterized

by connection than are characterized by isolation, a comparison of the

results from Question 1 and Question 2 provide some evidence which

contradicts the analysis from Question 3: the most frequently cited source of

professional isolation is cited by 1.56 as many teachers as the most frequently

cited source of professional connection (60.2%/38.5%). Professional

connection is a relatively new concept, so the result might be due to an

underreporting of professional connection. In other words, teachers may

have experienced sources of professional connection, but may not have

explicitly recognized them as such. Alternatively, there may be ways in

which isolation and connection are both dominant conditions. If so, it is a

paradox which can lie in waiting for another graduate student looking for a

dissertation topic.

Table 11: An unweighted estimate of the relative strength of connection
with reference to each category of teacher which is calculated by dividing the
number of teachers who responded with "Strong Connection" or "Some
Connection" by the number of teachers who responded with "Strong
Isolation" or "Some Isolation", and a weighted estimate where the numbers
for "Strong Connection" and "Strong Isolation" are multiplied by 2.

Category of teachers with which participating teachers have relationships primarily characterized by Connection or Isolation	Connection /Isolation weighted	Connection /Isolation unweighted
my own school, and my subject	5.69	4.789
my own school, but other subjects	5.13	5.529
my own school district, and my subject	1.39	1.694
my own school district, but other subjects	0.89	1.136
other school districts, and my subject	1.08	1.326
other school districts, but other subjects	0.08	0.125

   Table 11 is an attempt to create a mathematical estimate for the overall

level of connection relative to isolation. As can be seen from Table 11,

whether the estimate of strength of connection is calculated as a weighted or

an unweighted estimate, both options for "my own school" have similar

overall conditions. Similarly, both options for "my own school district"
along with "other school districts, and my subject" have similar conditions
where the balance is slightly in favor of connection. Regardless of how the
estimate is calculated, the strength of connection for "other school districts,
but other subjects" is very weak.

  Table 11 raises the intriguing possibility that a community of practice
could be designed to enhance professional connection in "other school
districts, but other subjects" by building on the apparent similarity of "my
own school district" and "other school districts, and my subject". To do this,
a school district would need to build a district-level, interdisciplinary
community of practice. Members of this community of practice would
participate in statewide or national communities of practice, with the
specific aim of bringing back ideas which would be useful for the local
discussion of the possible connections between subjects. When displayed as
a diagram, such a design might look something like Figure 7. In this
simplified community of practice diagram, the circles with arrows represent
lines of communication between the participants in that community of
practice, and the space within the circle represents the participants. It
should be noted that by being linked together as shown in Figure 7, all three
communities of practice meet both the test of having a common task about
which a group of people communicate among themselves, and a larger
network or group to which the first group communicates out.
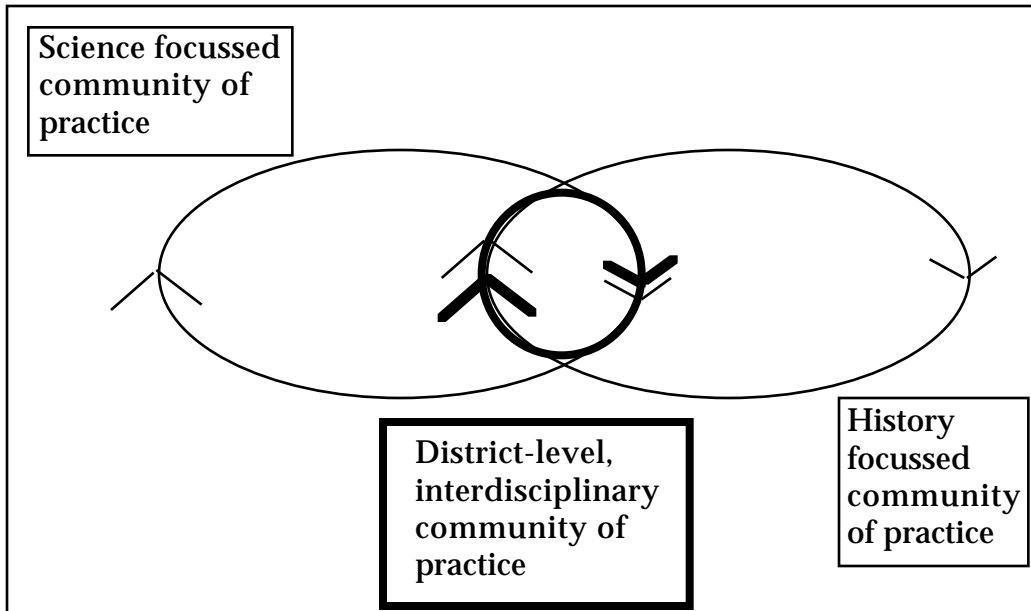
Figure 7: A diagram showing the relationships between three communities of practice.

From the above Tables 9 and 11, it can be seen that the overall level of professional connection of "my own school district, and my subject" is very close to that of "other school districts, and my subject". However, by looking at the results from Question 9, "The teachers with whom I have productive relationships work in: (circle all that apply)", it becomes apparent that all other school districts are not alike. (Figure 8) Moreover, they are not alike in at least one counter-intuitive way which can be seen in Figure 8.

The following Figure 8 shows the number of teachers who indicated productive relationships with other teachers in each of the successively larger regions. Please note that the last category, "None Circled", should be treated with some care since there was no way to distinguish between participants who circled none of the regions because they had no productive

relationships, from participants who circled none because they skipped the

question.
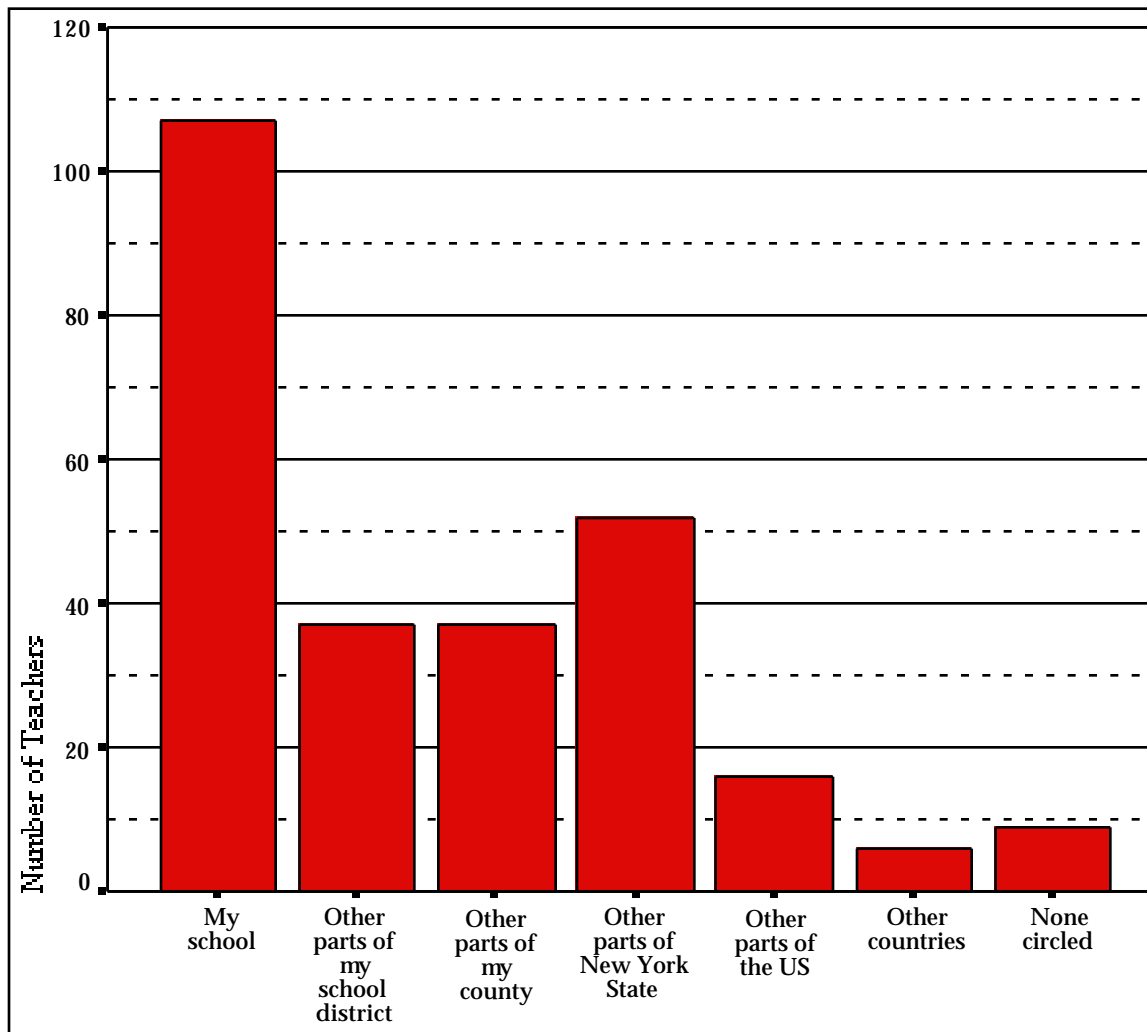
Figure 8: A bar graph of the number of participating teachers who indicated
having productive relationships with other teachers who work in each of a
series of regions.

The results from Question 9 follow the pattern one might expect. The

most productive relationships are with other teachers who work in the

closest region, and the least productive relationships are with other teachers

in the farthest region. The one exception is the spike at "Other parts of New York State".

Figure 8 appears to show that productive relationships in other parts of New York State are higher than would otherwise be expected. I have run several statistical tests to determine whether the effect is real in the sense of being statistically significant.

Before I go any further, I am going to define all of the variables that are used in the following calculations. In the SPSS/statistics output (Tables 13-16), "Rel" is short for "Productive Relationships".

The sole purpose of Tables 13-16, which follow below Table 12, is to show that what appears to be a gap between "my school" and "other parts of New York State" in Figure 8 is a statistically real phenomenon.

Table 12: Variable Names and Descriptions for Question 9.

Variable Name	Description of Variable
Q901	A variable in which teachers who circled "My school" were coded as 1, and teachers who did not circle "My school" were coded as 0.
Q902	A variable in which teachers who circled "Other parts of my school district" were coded as 1, and teachers who did not circle "Other parts of my school district" were coded as 0.
Q903	A variable in which teachers who circled "Other parts of my county" were coded as 1, and teachers who did not circle "Other parts of my county" were coded as 0.
Q904	A variable in which teachers who circled "Other parts of New York State" were coded as 1, and teachers who did not circle "Other parts of New York State" were coded as 0.
Q9c34	A comparison of Q903 with Q904, or more precisely, "Q903 - Q904"
Q9c24	A comparison of Q902 with Q904, or more precisely, "Q902 - Q904"

The following shows the summary statistics for a new variable Q9c34.

Table 13: Summary statistics for a variable which represents the difference in productive relationships with other teachers in "Other parts of my county" compared to "Other parts of New York State" for each participating teacher.

```
Q9C34       Q903 - Q904


                                            Valid      Cum
Value Label                 Value  Frequency  Percent  Percent  Percent

Rel in NYS, not County       -1        32      25.8     27.8     27.8
Rel in both or none           0        66      53.2     57.4     85.2
Rel in County, not NYS        1        17      13.7     14.8    100.0
                              .         9       7.3   Missing
                                     -------  -------  -------
                            Total     124     100.0    100.0

Mean           -.130


Valid cases      115    Missing cases      9
```

The following shows that the difference between the means of Q903 and

Q904 is statistically significant at the p = 0.032 level.

Table 14: Results of a One Sample t-test performed on the variable which represents the difference in productive relationships with other teachers in "Other parts of my county" compared to "Other parts of New York State" for each participating teacher.

```
One Sample t-tests


                          Number
 Variable                 of Cases      Mean        SD   SE of Mean
 ----------------------------------------------------------------------
 Q9C34  Q903 - Q904          115       -.1304      .642         .060
 ----------------------------------------------------------------------


     Test Value = 0

  Mean              95% CI         |
  Difference    Lower    Upper     |   t-value       df   2-Tail Sig
 ----------------------------------------------------------------------
       -.13    -.249    -.012      |     -2.18       114        .032
 ----------------------------------------------------------------------
```

The following are summary statistics for a new variable Q9c24.

Table 15: Summary statistics for a variable which represents the difference in productive relationships with other teachers in "Other parts of my school district" compared to "Other parts of New York State" for each participating teacher.

```
|Q9C24     Q902 - Q904                                                  |
|                                                                       |
|                                                                       |
|                                               Valid      Cum          |
|Value Label               Value  Frequency  Percent  Percent  Percent  |
|                                                                       |
|Rel in NYS, not District    -1        28      22.6     24.3     24.3   |
|Rel in both or none          0        74      59.7     64.3     88.7   |
|Rel in District, not NYS     1        13      10.5     11.3    100.0   |
|                             .         9       7.3   Missing          |
|                                  -------   -------   -------          |
|                           Total     124     100.0     100.0          |
|                                                                       |
|Mean          -.130                                                    |
|                                                                       |
|                                                                       |
|Valid cases     115     Missing cases      9                           |
```

The following shows that the difference between the means of Q902 and

Q904 is statistically significant at the p = 0.018 level.

Table 16: Results of a One Sample t-test performed on the variable which represents the difference in productive relationships with other teachers in "Other parts of my school district" compared to "Other parts of New York State" for each participating teacher.

```
|One Sample t-tests                                                     |
|                                                                       |
|                                                                       |
|                         Number                                        |
| Variable               of Cases      Mean        SD   SE of Mean     |
| -------------------------------------------------------------------- |
| Q9C24  Q902 - Q904        115       -.1304      .585        .055     |
| -------------------------------------------------------------------- |
|                                                                       |
|                                                                       |
|     Test Value = 0                                                    |
|                                                                       |
|  Mean            95% CI            |                                  |
|  Difference   Lower    Upper       |   t-value       df    2-Tail Sig |
|  ------------------------------------------------------------------- |
|      -.13    -.239    -.022        |    -2.39       114         .018 |
|  ------------------------------------------------------------------- |
```

The One Sample t-tests indicate that the spike at "Other parts of New York State" is a real effect because Q904 is significantly different from both Q902 and Q903. This result is important because it provides partial evidence for what I often refer to as the LabNet Paradox: DiMauro and Jacob's hunch that many teachers participating in TERC's LabNet project experienced a greater sense of community with teachers distributed around the country than they did with teachers in their own schools.

The qualitative portion of this study provides some evidence for why the spike exists. First, "State or National conferences" is the second most frequently cited source of professional connection. "High participation in professional organizations" is less frequently cited, but is still in the second third. It is likely that state level organizations are doing something that is having a positive impact on teachers, at least in New York State. The Science Teachers Association of New York State (STANYS), was mentioned by name by seven teachers. This was more than any other specific organization. The Cornell Institute for Biology Teachers (CIBT) came in second with mentions by four teachers. CIBT is a project with participation across much of New York State run by Dr. Rita Calvo at Cornell University. Second, there is evidence, although of a more limited nature, which indicates that districts have not been promoting local inter-district networking. What evidence there is comes from responses to "Lack of Money" as a source of professional isolation, and Question 6. For instance, one teacher commented that "one of the first cuts in school budgets is conference money." In Question 6, "If your relationships (connection/isolation) with other teachers differs between your colleagues

in your own school and colleagues elsewhere (in Question 3), please suggest reasons for this difference.", one teacher remarked that "the school district has <u>not</u> been one to promote connection with other districts."

Thus, it is reasonable to conclude both that statewide initiatives have had success and should be continued, as well as that regional efforts on the order of county could yield currently unrealized results. This would be an argument in support of existing collaborative efforts, such as the BOCES system in New York State, as well as newer efforts, such as to create networks of professional development schools.

To probe this issue further, one might want to conduct a study in which questions would be asked such as, "Suggest reasons that a teacher network in your local region (such as your county) might be beneficial, suggest obstacles you might encounter when trying to establish such a network, and suggest strategies you might use to establish such a network."

The data from Question 9 can be examined in two alternate ways. If the district and county responses to Question 9 are combined (Figure 9), the results are consistent with the hypothesis that proximity facilitates connection. However, the decline from the combined variable "District or County" to "Other parts of New York State" is very small. Under this view of the data, I would have expected "District or County" to be noticably higher than "Other parts of New York State". Thus, I would argue that even this alternate examination of the data supports the conclusions stated above: statewide organizations have had a positive impact on professional

connection, and there is an opportunity to improve professional connection on a local-region basis.
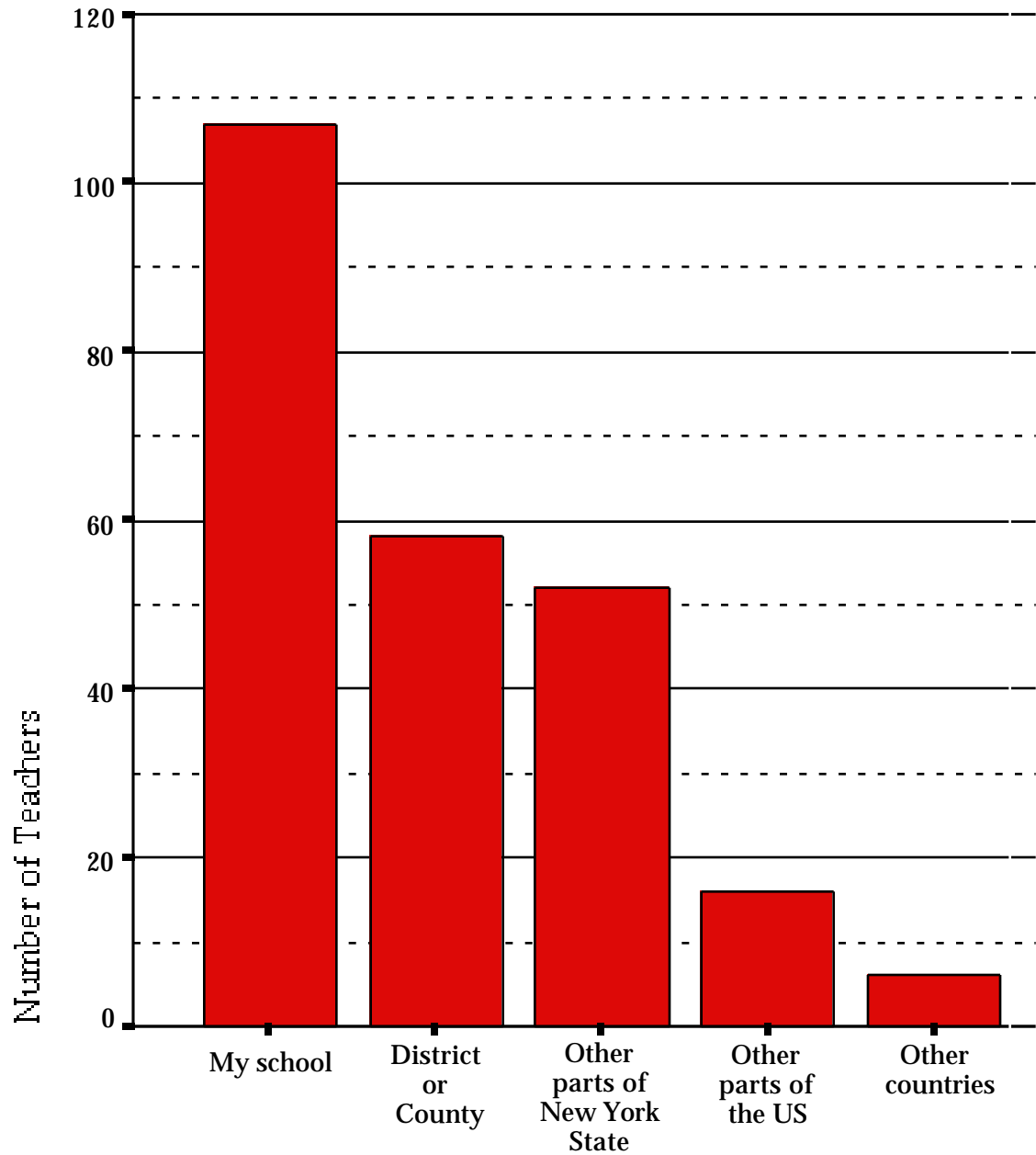
Figure 9. A bar graph of the number of participating teachers who indicated having productive relationships with other teachers in each of a series of regions, and where categories for District and County were combined.

Furthermore, all ten counties in the region of this study have a minimum of two school districts per county, and four counties have six or more school districts (Figure 10). In addition, it should be noted Figure 10 only shows school districts in this study's region. Especially in the case of Onondaga county, Figure 10 underrepresents the number of school districts per county because there are several school districts in the Syracuse area which are in Onondaga county but which are not in a BOCES district used to define the region of this study. Therefore, it is unlikely that teachers in this study would have indicated a lack of productive relationships in "Other parts of my county" due to a perception that their school district covered the same region as their county.
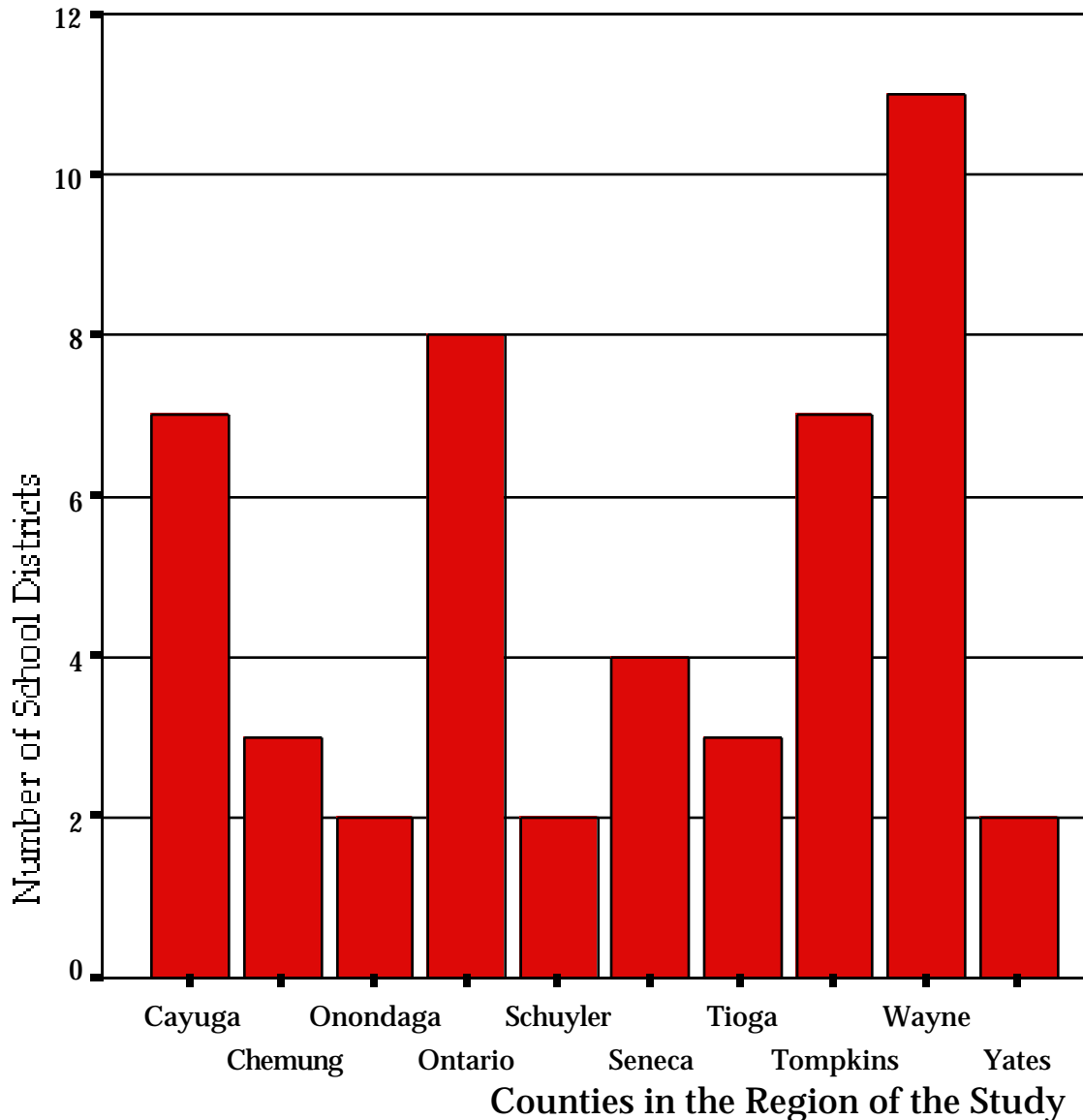
Figure 10. Number of School Districts per County.

  On the other hand, it is reasonable to assume that some teachers

considered their school and their school district to be identical regions.

Several of the school districts contain all grade levels in one building, and

the teachers generally do not think of the grade level divisions (Lower,

Middle, and Upper Schools, etc.) as separate schools. Teachers with such a

conception who reported productive relationships in their own school

might have left the "Other parts of my school district" option blank because they would consider it redundant. Based upon this reasoning, Figure 11 shows the results for Question 9 where the "My School" and "Other parts of my school district" categories have been combined.
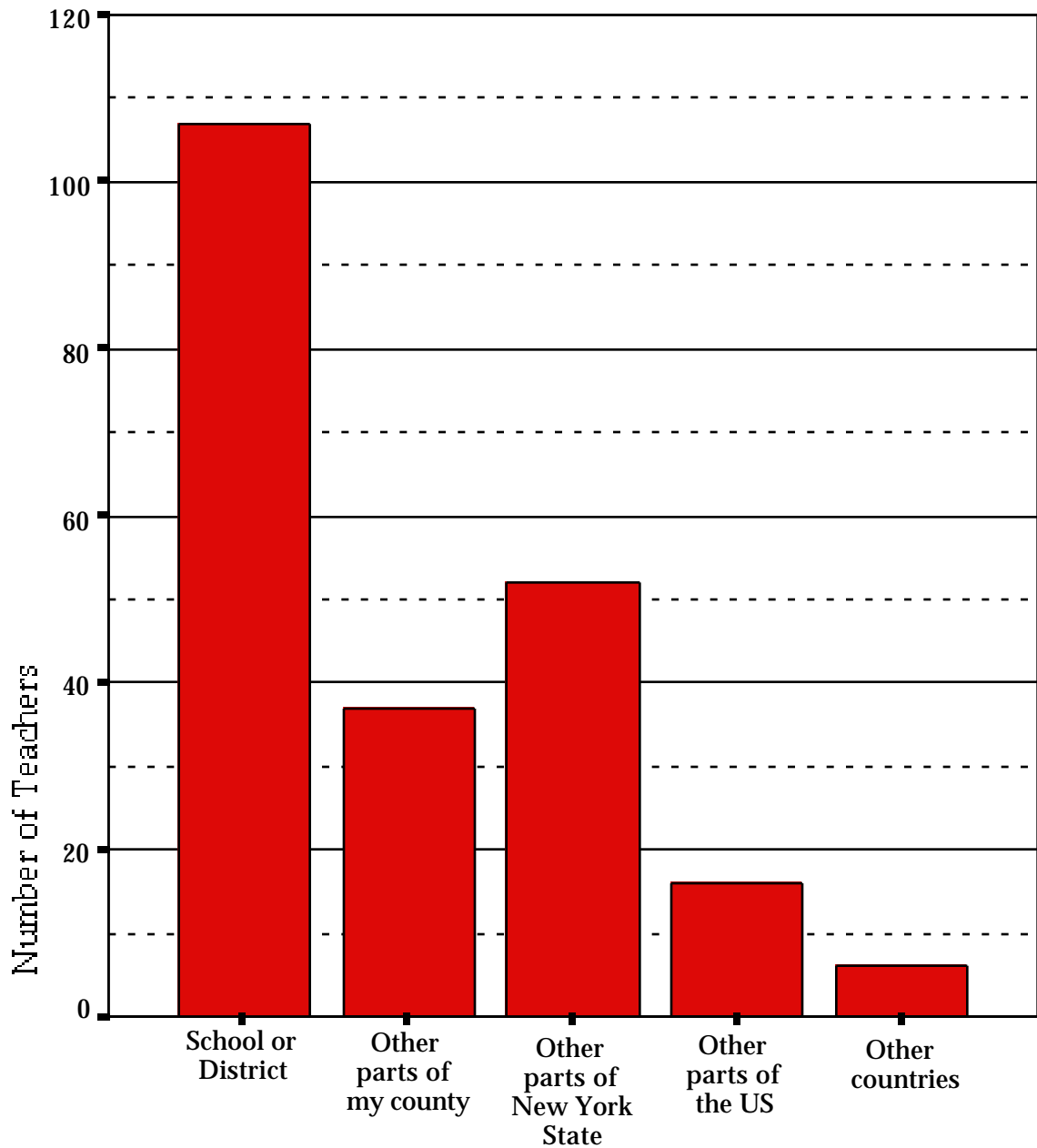
Figure 11. A bar graph of the number of participating teachers who indicated having productive relationships with other teachers who work in each of a series of regions, and where categories for School and District were combined.

With such an examination (Figure 11), the local-region gap remains.

This extended analysis suggests that teachers can effectively tap into the expertise of their fellow teachers by utilizing the organizational structures

that exist around them, and that policy makers can help teachers tap such expertise by encouraging such organizations to express their potential for service to teachers. While it would be productive to conduct a further study to probe this issue in more depth, for now it can be said that statewide organizations, such as STANYS and CIBT, and multi-county organizations such as BOCES, have had a positive impact on professional connection. There is an opportunity for local-region organizations, especially on the county level, to make a positive impact on teachers' abilities to help each other. Counties are an important organizational unit both because of existing structures of county government, the presence of non-profit organizations which may be organized by county, and by community wide efforts to improve access to computer networks, such as the active effort currently under weigh in Tompkins County. In the case of each of these kinds of county-based organizations, a little extra investment in existing efforts could have a big payoff for the schools.

How have teachers experienced these differences between sets of relationships?

  Question 6 asked "If your relationships (connection/isolation) with other teachers differs between your colleagues in your own school and colleagues elsewhere (in Question 3), please suggest reasons for this difference."

  My general assessment of Question 6 is that it did not work as well as I had hoped. Many responses did not compare sets of relationships. I believe that part of the problem was that I was attempting to create a detector for the Labnet Paradox (where teachers experience a greater sense of community

with teachers dispersed around the country than they do with teachers in their own school), so the answer to the question seems oddly self-evident when the Labnet Paradox is not present. Some teachers had difficulty answering the question because they didn't feel that they have experienced professional connection with teachers in other districts, and therefore were not in a position to compare sets of relationships.

The responses to Question 6 seem to fall into a category system which can be roughly correlated with portions of the five commonplaces of education. The categories can be summarized as comments which relate to Frequency or Time, Organization, Attitude or Philosophy, and Nature of communication.

Frequency/Time (Milieu)

Professional connection can happen only when there is the opportunity for it to happen. One teacher remarked that "Isolation with teachers from other districts and even in our own district is simply because of time and geography." Another teacher remarked that "I see my colleagues in my own school much more often. Therefore, I am more connected." There may be insufficient opportunities for connection. One teacher remarked that "There needs to be more follow up time." The opportunities that do exist may limit the kinds of connection that can happen. One teacher remarked that "Much of our connecting is done 'on the run' - a few minutes snatched here and there."

The dominant idea within this theme is that proximity facilitates connection.

Organization (Milieu)

Organizational factors can create both positive and negative conditions.

One teacher discussed positive conditions. "My relationships with my colleagues here at my own school are much closer because we are a small faculty and have a high degree of trust with one another. We are a family in the true sense of the word." Another teacher wrote that "I have been involved with state and national organizations so I believe I may have a greater connection with others outside the district."

Another teacher discussed negative conditions. "The school district has not been one to promote connection with other districts." Another teacher commented on this more specifically by writing that there is a "lack of a forum for any professional interaction." Another teacher remarked that "Being a small district the people have a tendency to form cliques." A third teacher wrote that "I think there is a male vs. female mentality in our Science department that could cause a difference."

Thus, positive conditions discussed revolve around trust, whether at the school or the state level. Negative conditions include districts' lack of promotion of connection between teachers, and personal divisions that can arise spontaneously.

Attitude/Philosophy (Teacher)

Some teachers compared themselves to other teachers. One teacher remarked that "Most [other teachers] don't have the same high standards as I, nor the high expectations - so philosophy is very different." A second teacher wrote that "I have been a little more aggressive in pursuit of this kind of professional contact." A third teacher remarked that "The 'other' biology teacher, with whom I must work closely, is negative and narrow minded. He is rarely interested in trying new things. He also makes me feel inept when I give notes." A fourth teacher wrote that "I find colleagues who share my philosophy or who I can learn from, regardless of location or subject." A fifth teacher remarked that "I am more respected as a 'leader' and 'expert' by those who teach in other parts of the country but use my ideas (from workshops I conduct)."

Some teachers compared sets of relationships. One teacher remarked that "Peers outside my building are more willing to try new approaches and materials than those with whom I work." A second teacher remarked that "It seems there is an US vs. THEM mentality [between the regular high school and the alternative public high school], and the word around here is they don't like us because we are the alternative high school."

Thus, reasons for differences between sets of relationships can come down to the difference between teachers who are willing to put out the extra effort to seek connection with other teachers, and teachers who are not willing to put out that extra effort.

Nature of communication (Subject Matter)

One teacher wrote that "I share <u>biology</u> with teachers from other districts. I share <u>local issues</u> with colleagues in my own school."

Admittedly, one quote does not usually provide justification for its own category, but in this case I thought it provided a very interesting insight into the complexity of limited professional dialogue.

Given that a certain range of isolation has been experienced by teachers, and given the assumption that connection is good, how have teachers been moved or moved themselves to obtain connection?

Question 7 asked "What motivates you to seek professional connection?"

The responses have been categorized according to Schwab's Four Commonplaces of Education. A fifth Commonplace, "evaluation", was suggested by Novak and has been included here. At one point, I argued that "Tools" should be a sixth commonplace, but more recently I have come to the opinion that subject matter in education always comes embedded in a delivery system or a tool, so "tools" is best thought of as an extension of the "Subject matter" commonplace.

Teacher

Teachers seek professional connection because they "love to learn", find it "stimulating to broaden one's perspective", and find it "rejuvenating". They want to improve their teaching and personal knowledge, including but not limited to keeping up to date with new technology and keeping up

to date in a subject area. "Most connections I make are to enhance what I do as a classroom teacher." Teachers who seek professional connection "continuously strive to be a better teacher." As one teacher remarked, "It's important no matter your age or how long you teach to always want to improve." Teachers need to realize they can grow. They need to find ways to grow, stay interested, satisfy curiosity, and avoid stagnation.

Sometimes motivation is negative in nature. "The feeling of being left out and falling behind in my knowledge has motivated me to participate in the programs I have been able to attend." Some teachers seek professional connection because "teaching in the classroom stultified the energy level."

Student

Teachers seek professional connection for "the chance to share just a little bit more with the students than they [the students] are required to know." Teachers want to bring the best to students, especially during the students' most formative years. Teachers want to "produce a better student who is able to think and have pride in work." They want to reach all of their students so that all of their students can pass with 100%. Teachers are motivated to seek professional connection so that they can in turn find better ways of motivating their students. Professional connection "makes for better classroom teaching [which creates] a better experience for students." Some teachers cite "love for my students" as a motivation to seek professional connection.

Subject Matter/Tools

Teachers seek professional connection because they are always looking for new ideas, new materials, motivational teaching strategies, and exciting projects to do. As one teacher commented, "I like to share ideas on new labs that are clearer or more motivating than the ones suggested by NYS."

Another teacher remarked, "As teacher I wish to be 'well armed' with a variety of delivery systems of content." This includes "seeking new ways to explain old ideas."

They look for new technology delivered in ways that they can use in their classrooms.

Milieu

Teachers seek professional connection out of a "need to address school-wide issues: attendance, tracking, and a sense of community."

Teachers seek various types of communities of peers within which they can communicate. One teacher wrote that "It's great to talk on the same level in the 'academia world' with similar type individuals." A second teacher commented that "I am motivated by a need to discuss my field with individuals beyond the age of eighteen." A third teacher remarked that

"The chance to speak to someone that understands the jargon (i.e. ISS or OSS[12]) without explanation."

Teachers seek community to find validation of the quality of their work. As one teacher remarked, I "want to be regarded as a good science teacher by my peers, students, and the community."

Teachers seek connection "to benefit from diverse backgrounds."

One teacher wrote that "It feels good to feel like part of a team." Teachers like "knowing that problems [they] experience are not unique."

Another teacher wrote that "A new textbook has required me to 'RE-GROUP'." A sixth teacher commented that "Ever changing state mandates/testing procedures/curricula/test content are but some of the reasons I seek connection."

Evaluation

Professional connection "gives me constructive feedback to improve myself."

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[12] While communication that does not need explanation may be more efficient within a given population, it tends to impede understanding across population boundaries.

Are there reasons for believing that, or are there circumstances under which, the assumption that 'isolation is bad and connection is good' is flawed?

Question 8 asked "Has isolation ever been a positive influence for your teaching? If yes, please describe the circumstances."

The basic analysis of Question 8 also uses Novak's modified version of Schwab's Four Commonplaces of Education as a category system.

Teacher

Some teachers argue that isolation caused them to develop their own style, strategies, and confidence. One teacher remarked that "I have acquired self-confidence over the years handling classrooms situations by myself." A second teacher wrote that "I like the feeling of autonomy in having my own room and in being in charge of my own teaching." A third teacher remarked that "It has made me stronger, self-reliant, more responsible and more understanding of my fellow man." A fourth teacher wrote that "I can't learn on someone else - if I want it I have to do it." A fifth teacher wrote that "It provides a sink or swim behavior pattern and provides self esteem when it works!"

Student

Isolation can be positive because "for a while my students in small rural America were away from crime, drugs (hard), and 'the farm' kept families together." A second teacher wrote that "I have developed ways that make

teaching more enjoyable for my students." A third teacher remarked that "Being the only teacher in my area has given me the freedom to be consistent with all of the students." A fourth teacher wrote that "Kids must be ready for the regents exam." A fifth teacher wrote that "I think it may make me try harder in order to not cheat my students (say a lack of $$ to purchase equipment may make me be more creative to find ways to do without the $$.)" A sixth teacher remarked that "I have my own world of classes in which we work like a family and I don't have to be running around to meetings, conferences, visitations, etc. My age level sometimes considers me their substitute mother."

Subject Matter/Tools

One teacher wrote that "I feel free to design my own course from lecture style to lab activities to tests. Revising my course and constantly working to improve it takes a great deal of time and hard work and I am very constrained by my budget." A second teacher wrote that "Our district is very small so I get total control over my own classroom, methods, curriculum (within state guidelines), labs, etc." A third teacher remarked that "I worry less about the pace, particular style and choices in my teaching, as the only chem/phys teacher - I believe my teaching is better for that fact." A fourth teacher remarked that "I have developed my own ideas and approaches without having to follow others." A fifth teacher wrote that "Too many cooks spoil the broth. Sometimes too many ideas can lead to chaos. I enjoy doing my own thing when teaching my subject." A sixth teacher remarked that "It has allowed me to develop many skills on my own through trial

and error. Mistakes which result can be positive if you learn from them."
A seventh teacher remarked that "There have been times when I was the
only teacher of a subject that had been neglected previously. This gave me
freedom to do whatever I wanted as long as it got the job done. But I was
also younger then!" An eighth teacher remarked that "Sometimes I have a
good idea and I just need to work on it by myself." A ninth teacher
remarked that "It makes you create ideas of your own." A tenth teacher
remarked that "It has provided me with new things to try in my classroom."

Milieu

One teacher wrote that "Being isolated has allowed me to block out some
of the more useless demands on my time by administrators." A second
teacher wrote that "I don't have a department head who says I need to be on
page 299 on Dec. 17." A third teacher wrote that "Not personally, but older
teachers have described how not conforming to new teaching styles has
helped because they (new styles) usually 'fall by the wayside' so they're glad
they didn't waste their time initially." A fourth teacher remarked that "Yes,
when Admin leaves me isolated to teach as I see fit and doesn't try to mold
my teaching style in their image (vision)." A fifth teacher wrote that
"Isolation from administrators has always been welcomed!" A sixth teacher
remarked that "The administration doesn't bother us very much. They let
us do our job without much/any interference." A seventh teacher
remarked that "No problem if I have it. I do enjoy the hands off approach
of our administration in our district." An eighth teacher remarked that "I
prefer that the administration let me teach without their interference."

Evaluation

One teacher wrote that "I feel in control of my subject with no one else to judge me. My Regents scores are totally my responsibility and a 98% passing rate builds my self-esteem as well as knowing enrollment has tripled in 5 years." A second teacher remarked that "Of course. There is little oversight of my work. As a result, I do not encounter much criticism." A third teacher remarked that "I feel it has pushed me to strive for excellence in everything I do. It may be an attempt on my part to 'show them' I'm just as good as they are." A fourth teacher remarked that "The autonomy that I have has been a great source of satisfaction. The fact that in 25 years, no one has really questioned what I am doing makes me feel that the district has confidence in my abilities. I have the chance to run my 'own ship.'"

No

Twenty teachers responded with "No" or its equivalent. One teacher commented that "I don't believe that professional isolation has a place in today's society. We need to exchange ideas and methods."

Gender Analysis

Gender is consistently in the bottom 10 sources of both isolation and connection, no matter how the results are recoded. These overall numbers, however, potentially mask an important story being played out in some schools. The evidence for this can be found in the open ended responses,

and in the significant differences reported in Table 17. Since 32% to 38%[13] of the participants were female, and women comprise 39% of the high school science teachers in the state of New York (of the 11,451 high school science teachers in the state, 4,466 were women in the Fall of 1995) (Caruso, 1995b), the results of this study should be fairly representative of gender issues. However, since the open ended portion of the survey only allowed participants to respond to one item, it is possible that a story such as gender may have more importance than the number of participants who discussed gender specifically would indicate.

Two teachers thought gender was important enough to comment upon. One teacher remarked that "I think that there is a male vs. female mentality in our Science department that could cause a difference [between relations with the teacher's colleagues in that teacher's own school compared to relations with colleagues elsewhere]." Another teacher describes how gender can be isolating in more detail. "The two main areas of isolation I feel are gender and the curriculum I am expected to teach. The department (science) was all male until I was hired and it is still male dominated. I feel that curriculum (course) assignments are gender biased and that I am on the outside of 'The Old Boy's Network'. Though we are all certified to teach General Science, the course is consistently given to me because 'it would be a waste of their certification areas' to assign it to the men who teach all Regents Courses. This inspite of the fact that I am certified to teach 4 areas of science and could easily replace the males."

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[13] if all seven teachers who didn't indicate a gender happened to be female.

Analysis of Quantitative Data by Characteristics of Teachers

All data for this section either started out as Boolean data or were reduced to Boolean data. The Chi-Square test was then applied to each variable. These results are not meant to be conclusive in and of themselves. Rather they are primarily presented for the purpose of hypothesis generation for future studies. If the differences are real, one would expect that they would be shown to be statistically significant in other populations of teachers.

I have chosen to present both statistically significant differences as well as statistically significant similarities. The logic behind statistically significant differences is that a low p value indicates that there is a low chance that a result which has been computed to be significantly different really is not. Therefore by the same logic, a high value of p should indicate that there is a low chance that a result which appears to be similar really is not. Or in other words, a low value of (1 - p) should indicate that there is a low chance that a result which appears to be similar really is not. I do not claim to be a professional statistician, but I have spoken to one who is; he felt that the logic was reasonable. (Schulman, 1996)

Statistically significant similarities are important because otherwise research will only find differences. Those differences may be real, but they may also simply be an artifact of the limitations of the analysis which was utilized. In the context of today's society, the last thing we need is an artifact which divides us unnecessarily by race, gender, or any other criteria.

Statistically significant similarity is not an established statistical procedure. Reporting such similarities is unorthodox at a minimum, and may be considered heretical in some circles. In order to give the reports of similarity appropriate weight, and to make a concession to convention, I will hereafter refer to statistically significant similarities as "extreme similarities."

In the tables below, p values which are reported are either below 0.05 or above 0.95. Percentages in bold indicate the category with the highest percentage for that question. An isolation Boolean variable is a data reduction where the variable is scored 1 if the original answer was either "Strong Isolation" or "Some Isolation", and is scored 0 if it was "Neutral", "Some Connection" or "Strong Connection". A connection Boolean variable is a data reduction where the variable is scored 1 if the original answer was either "Strong Connection" or "Some Connection", and is scored 0 if it was "Neutral", "Some Isolation" or "Strong Isolation". The Teachers' Years of Full Time Experience variable was grouped at 3 and 5 years because these are often the amounts of experience used to distinguish between novice and experienced teachers. For the 3 group analysis of this same variable, 20 years was chosen as the break point because the histogram of this variable (Figure 4) suggested that this was a logical place to divide the categories.

In the following Tables 17-28, "% of [characteristic] = Major" indicates the percentage of participants with that characteristic (male, female, years of experience, etc.) who marked that item as a major source of isolation (in Question 1) or connection (in Question 2). Similarly, "% of [characteristic] =

Circled" indicates the percentage of participants with that characteristic who circled that item in Question 9. By the same token, "% of [characteristic] = [Isolation or Connection]" indicates the percentage of participants with that characteristic who marked either "Strong Isolation" or "Some Isolation" when the result is from an isolation Boolean variable, or "Strong Connection" or "Some Connection" when the result is from a connection Boolean variable. The N values reported for each item are the number of teachers with that characteristic who reported that option, such as "Major." Overall N for these Chi-Square tests range from 111 to 117 depending on the item.

  Chi-Square tests were run for breakdowns by gender, highest educational level attained, and Teachers' Years of Full Time Experience. The tests were run for all question items for each of these breakdowns. No other tests were run. It is recognized that when large numbers of statistical tests are run, some will be significant by chance alone. p values were not adjusted to take into account the number of tests run because these results are intended primarily for the purposes of hypothesis generation. Moreover, according to Ryan, the preferred method to account for the effect of multiple comparisons is to calculate the Error Rate per Experiment (EP). (Ryan, 1959) The equation for this is $EP = k(p_{1/1})$, where k is the number of comparisons run, and $(p_{1/1})$ is the p value for each test. Since this study reports multiple p values, and Ryan's work was done at a time when a single p value was generally used, the average of reported p values was calculated. This

average p value = 0.0303. Since 5 comparisons[14] were run for each variable, EP per variable = 0.1517. Since there are 87 variables (37 in Question 1, 32 in Question 2, 6 variables with two reductions each in Question 3, and 6 variables in Question 9), the total EP = 13.20. In other words, it should be expected that there will be about 0.15 false positives in each variable, or 13.2 or fewer false positives across all comparisons, but there is no way of knowing which results are false positives.

The analysis of these results should be treated as plausible, but tentative hypotheses that could be tested in future studies.

Gender

An analysis of gender was chosen because gender is a major variable along which society is divided. Such a division is deeply embedded in language. Moreover, in the past fewer women took high school science than did men, so one might expect gender differences among teachers.

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[14] The two comparisons of Teachers' Years of Full Time Experience that used three categories are counted as one comparison because the lowest groupings are the same as the two comparisons which test only the lowest groupings.

Table 17: A summary of question items where there was a significant difference when the responses were broken down by gender at the p = 0.05 level using the Chi-Square Test.

Variable	Label	p value	% of Male = Major	% of Female = Major
Q109	Community attitudes (source of isolation)	**0.02745**	**N = 31** **40.3%**	N = 8 20.0%
Q111	Family obligations (source of isolation)	**0.01018**	N = 6 7.8%	**N = 10** **25.0%**
Q125	Lack of time (source of isolation)	**0.03205**	N = 40 51.9%	**N = 29** **72.5%**
Q210	Friendship (source of connection)	**0.04992**	N = 26 33.8%	**N = 21** **52.5%**
			% of Male = Circled	% of Female = Circled
Q905	Other parts of the US (productive relationships)	**0.04839**	N = 7 9.5%	**N = 9** **23.1%**

Table 18: A summary of question items where there was an extreme similarity when the responses were broken down by gender at the p = 0.95 level using the Chi-Square Test.

Variable	Label	p value	% of Male = Major	% of Female = Major
Q201	A feeling that administration nurtures and cares about teachers (source of connection)	**0.97760**	N = 12 15.6%	N= 6 15.4%

The following analysis is a tentative hypothesis based upon the results shown in Tables 17 and 18.

In American society, women often have a style of interaction characterized by cooperation and emotional rapport, whereas men often have a style of interaction characterized by conflict and rule-making, which is discussed in the work of Deborah Tannen (Tannen, 1990; Tannen, 1994). If one accepts such a premise, which is admittedly a generalization, then it would be reasonable that women are more likely to see or seek friendship as a source

of professional connection. By the same token, it would also be reasonable that men would be more likely to view community attitudes as a source of professional isolation because they would be less willing to negotiate a difference of position with the community.

The result that women are more likely to view family obligations and lack of time as sources of professional isolation could be due to the traditional female role of primary care giver, the increasing demand for women in the workplace, and the lingering inability of men to wash dishes. (Turiel, 1996)

On the other hand, men and women are equally likely to view "a feeling that administration nurtures and cares about teachers" as a source of professional connection. Thus, a difference in ability to recognize emotion can not account for all of the difference between men and women.

Highest Educational Level Attained

An analysis of Highest Educational Level Attained was chosen because schools regard teachers with higher educational levels differently from those with less education. Teacher salary scales are often based in part on the educational level attained, so someone believes that teachers with higher educational levels bring something extra to the school. In addition, more education should result in more opportunities for professional connection.

Table 19: A summary of question items where there was a significant difference when the responses were broken down by highest educational level attained at the p = 0.05 level using the Chi-Square Test.

Variable	Label	p value	% of BA/BS = Isolation	% of Masters = Isolation	% of Masters + 30 hours = Isolation
Q302iboo	my own school, but other subjects (Isolation Boolean)	**0.01137**	N = 1 3.8%	**N = 11** **28.2%**	N = 5 10.0%
Q304iboo	my own school district, but other subjects (Isolation Boolean)	**0.02309**	N = 7 26.9%	**N = 21** **55.3%**	N = 15 30.0%
			% of BA/BS = Circled	% of Masters = Circled	% of Masters + 30 hours = Circled
Q904	Other parts of New York State (productive relationships)	**0.00636**	**N = 15** **60.0%**	N = 10 25.6%	**N = 27** **55.1%**

Table 20: A summary of question items where there was an extreme similarity when the responses were broken down by highest educational level attained at the p = 0.95 level using the Chi-Square Test.

Variable	Label	p value	% of BA/BS = Major	% of Masters = Major	% of Masters + 30 hours = Major
Q116	Lack of computer networks (source of isolation)	**0.98018**	N = 6 23.1%	N = 10 25.0%	N = 12 23.5%
Q217	Other teachers' interest in trying new approaches (source of connection)	**0.96456**	N = 4 15.4%	N = 7 17.5%	N = 8 15.7%

The following analysis is a tentative hypothesis based upon the results shown in Tables 19 and 20.

It is possible that teachers with a Masters plus 30 hours or more are less likely to experience isolation with respect to colleagues in their own school and school district, but other subjects because they have a critical mass of education which supports inter-disciplinary connections. It is possible that teachers with a BA or BS are less likely to experience isolation with respect to those same colleagues because their relative lack of education creates a greater marginal benefit derived from assistance from their colleagues, whatever their subject area. This would also explain such teachers' greater likelihood of reporting productive relationships with teachers in other parts of New York State. The greater likelihood of teachers with a Masters plus 30 hours or more to report productive relationships with teachers in other parts of New York State could be due to greater experience providing more time to form long term working relationships.

The result in Table 20 where there is no difference between teachers with various levels of education and their likelihood to report "lack of computer networks" as a source of professional isolation indicates that whatever the cause of lack of computer networks as an obstacle, it is not due to the educational level of the teachers.

Teachers' Full Time Experience

An analysis of Teachers' Full Time Experience was chosen because the literature on professional isolation has examined the issue of novice versus experienced teachers before (Stevens, 1992; Zachmeier, 1969), and the literature on exemplary teachers often makes use of the same distinction. The breakdown of 0-3 years was chosen because such a breakdown has

obvious face validity in New York State: after the third year of teaching
teachers are either tenured or out. The breakdown of 0-5 years was chosen
because high teacher turnover continues at least into the 5th year (Stevens,
1992, p. 2) with about 45% of teachers leaving the profession by their 5th
year. There is also data which suggests that teaching competency levels out
at about the fifth year. Based upon this, Zachmeier suggested that "a
stronger presence of feelings of professional isolation in teachers beyond
their fifth year might imply that there is some relationship between that
phenomenon and a teacher's professional competence." (Zachmeier, 1969,
p. 47)

Table 21: A summary of question items where there was a significant
difference when the responses were broken down by Teachers' years of full
time experience, where teachers were categorized as having 0-3 years
experience or 4-35 years experience, at the $p = 0.05$ level using the Chi-
Square Test.

Variable	Label	p value	% of 0-3 yrs = Major	% of 4-35 yrs = Major
Q132	Paperwork (source of isolation)	**0.02973**	N = 3 20.0%	**N = 50** **50.0%**

Table 22: A summary of question items where there was an extreme
similarity when the responses were broken down by Teachers' years of full
time experience, where teachers were categorized as having 0-3 years
experience or 4-35 years experience, at the $p = 0.95$ level using the Chi-
Square Test.

Variable	Label	p value	% of 0-3 yrs = Connection	% of 4-35 yrs = Connection
Q303cboo	my own school district, and my subject (Connection Boolean)	**0.95648**	N = 8 53.3%	N = 51 52.6%

   The following analysis is a tentative hypothesis based upon the results
shown in Tables 21 and 22.

Teachers with more experience could be more likely to report paperwork as a source of professional isolation either because they have had more time to get sick of it, they have had more time to experience it at some point in their careers, or because they are given more of it.

Table 23: A summary of question items where there was a significant difference when the responses were broken down by Teachers' years of full time experience, where teachers were categorized as having 0-5 years experience or 6-35 years experience, at the p = 0.05 level using the Chi-Square Test.

Variable	Label	p value	% of 0-5 yrs = Circled	% of 6-35 yrs = Circled
Q904	Other parts of New York State (productive relationships)	**0.02379**	**N = 5** **23.8%**	**N = 46** **51.1%**

Table 24: A summary of question items where there was an extreme similarity when the responses were broken down by Teachers' years of full time experience, where teachers were categorized as having 0-5 years experience or 6-35 years experience, at the p = 0.95 level using the Chi-Square Test.

Variable	Label	p value	% of 0-5 yrs = Isolation	% of 6-35 yrs = Isolation
Q306iboo	other school districts, but other subjects (Isolation Boolean)	**0.99640**	**N = 15** **68.2%**	**N = 62** **68.1%**

The following analysis is a tentative hypothesis based upon the results shown in Tables 23 and 24.

The result that teachers with more experience are more likely to have productive relationships with teachers in other parts of New York State is consistent with the result from Table 19 regarding the greater likelihood of teachers with a Masters plus 30 hours or more to have such statewide productive relationships. They may also be more likely to have participated in in-service workshops which draw participants from across the state.

Table 25: A summary of question items where there was a significant difference when the responses were broken down by Teachers' years of full time experience, where teachers were categorized as having 0-3 years experience, 4-20 years experience or 21-35 years experience, at the p = 0.05 level using the Chi-Square Test.

Variable	Label	p value	% of 0-3 yrs = Major	% of 4-20 yrs = Major	% of 21-35 yrs = Major
Q117	Lack of informal teacher networks or support groups (source of isolation)	**0.04405**	N = 1 6.7%	N = 8 18.2%	**N = 19 33.9%**
Q126	Lack of trust (between teachers and teachers or administrators) (source of isolation)	**0.02481**	N = 1 6.7%	N = 10 22.7%	**N = 22 39.3%**
Q217	Other teachers' interest in trying new approaches (source of connection)	**0.02366**	N = 2 13.3%	**N = 13 29.5%**	N = 5 8.9%
			% of 0-3 yrs = Circled	% of 4-20 yrs = Circled	% of 21-35 yrs = Circled
Q905	Other parts of the US (productive relationships)	**0.04425**	**N = 5 35.7%**	N = 6 13.6%	N = 5 9.4%

Table 26: A summary of question items where there was an extreme similarity when the responses were broken down by Teachers' years of full time experience, where teachers were categorized as having 0-3 years experience, 4-20 years experience or 21-35 years experience, at the p = 0.95 level using the Chi-Square Test.

Variable	Label	p value	% of 0-3 yrs = Major	% of 4-20 yrs = Major	% of 21-35 yrs = Major
Q111	Family obligations (source of isolation)	**0.96064**	N = 2 13.3%	N = 7 15.9%	N = 8 14.3%
Q221	Planning periods (source of connection)	**0.99327**	N = 2 13.3%	N = 6 13.6%	N = 8 14.3%

Table 27: A summary of question items where there was a significant difference when the responses were broken down by Teachers' years of full time experience, where teachers were categorized as having 0-5 years experience, 6-20 years experience or 21-35 years experience, at the p = 0.05 level using the Chi-Square Test.

Variable	Label	p value	% of 0-5 yrs = Major	% of 6-20 yrs = Major	% of 21-35 yrs = Major
Q117	Lack of informal teacher networks or support groups (source of isolation)	**0.04589**	N = 2 9.1%	N = 7 18.9%	**N = 19 33.9%**
Q134	Staffing structure (such as lack of secretarial support for teachers) (source of isolation)	**0.03622**	N = 0 0.0%	N = 5 13.5%	**N = 13 23.2%**
Q217	Other teachers' interest in trying new approaches (source of connection)	**0.03470**	N = 4 18.2%	**N = 11 29.7%**	N = 5 8.9%

Table 28: A summary of question items where there was an extreme similarity when the responses were broken down by Teachers' years of full time experience, where teachers were categorized as having 0-5 years experience, 6-20 years experience or 21-35 years experience, at the p = 0.95 level using the Chi-Square Test.

Variable	Label	p value	% of 0-5 yrs = Major	% of 6-20 yrs = Major	% of 21-35 yrs = Major
Q109	Community attitudes (source of isolation)	**0.97971**	N = 7 31.8%	N = 12 32.4%	N = 19 33.9%
Q111	Family obligations (source of isolation)	**0.95395**	N = 3 13.6%	N = 6 16.2%	N = 8 14.3%
Q118	Lack of money (source of isolation)	**0.97486**	N = 9 40.9%	N = 16 43.2%	N = 23 41.1%
Q119	Lack of peer observations (observing each others' teaching) (source of isolation)	**0.99361**	N = 3 13.6%	N = 5 13.5%	N = 8 14.3%
Q221	Planning periods (source of connection)	**0.99361**	N = 3 13.6%	N = 5 13.5%	N = 8 14.3%
			% of 0-5 yrs = Isolation	% of 6-20 yrs = Isolation	% of 21-35 yrs = Isolation
Q306iboo	other school districts, but other subjects (Isolation Boolean)	**0.97663**	N = 15 68.2%	N = 25 69.4%	N = 37 67.3%

The following analysis is a tentative hypothesis based upon the results shown in Tables 25 and 27.

The greater likelihood of teachers with 21-35 years of full time experience to report "lack of informal teacher networks or support groups" and "lack of trust (between teachers and teachers or administrators)" and "staffing structure (such as lack of secretarial support)" as sources of professional isolation could be due to a greater opportunity to be exposed to such conditions over the course of their careers.

Teachers with 21-35 years of full time experience might be less likely to have reported having experienced "other teachers' interest in trying new approaches" as a source of professional connection because they are in the latter stages of their careers and are most comfortable teaching the way they have always taught.

Chapter 6 - Implications and Conclusions

   This report has been written for educational decision makers, primarily teachers and administrators. This report contains recommendations based upon a study of the professional isolation and connection of high school science teachers in upstate New York.

   All decisions are made in the context of risk. This should be self-evident, but it is worth repeating. All decisions are made in the context of risk. This risk arises from the inevitably incomplete nature of information available, the limited generalizability of the information available, and the idiosyncratic nature of each decision context. Decisions based upon this report are no exception. The school in which you participate may have different teachers, or students. The school may have a different organization. These differences may be particularly pronounced if your school is located in a large urban area.

   Even so, I would contend that most people have more in common than they do apart. I offer this report with confidence that it will help you find a way forward.

   There is some existing literature on professional isolation (Agor, 1985; Archer, 1990; Kenny, 1989; Minaker, 1993; Potter, 1991; Smith, 1989; Stevens, 1992; Young, 1988; Zachmeier, 1969), but until now there have been no comprehensive studies of the phenomenon. Furthermore, most existing studies contrast isolation with the autonomy that is often achieved as a

result of isolation. The entire concept of teachers seeking assistance from each other, as well as from other professionals, as a way of addressing that isolation has been missing.

The following is a summary of the major findings of this study. "Lack of time" was the most often cited source of professional isolation with 60.2% of the teachers responding that it was a major source. This was closely followed by "Paperwork" with 46.7%. This suggests that schools would do well to help teachers focus on what they are trained and hired to do: teach.

"Friendship" was the most often cited source of professional connection with 38.5%. The second most cited source was "State or National conferences" with 25.6%. This suggests that creating opportunities for connection, and most of all, the personal qualities of those opportunities, are vitally important to teachers successfully seeking and giving assistance to other teachers.

Unexpectedly infrequent sources include "The layout of your school's instructional space, such as teachers' spending most of the day in one classroom" as a major source of isolation, and "Computer networks" as a major source of connection.

Teachers relations with their colleagues are primarily characterized by connection, although the proportion of teachers who indicated connection relative to those who indicated isolation declines the farther away one goes from the teachers' own school.

Teachers' pattern of productive relationships with other teachers by region generally follow a common sense pattern: nearly all teachers report having productive relationships with teachers in their own school, and progressively fewer teachers report productive relationships with teachers in progressively more distant regions. However, more teachers report productive relationships with teachers in "Other parts of New York State" than they do in "Other parts of my school district" or in "Other parts of my county". The difference between "Other parts of New York State" and the other two categories is statistically significant. This finding provides evidence to support DiMauro and Gal's hunch that teachers in LabNet felt a greater sense of community with other LabNet teachers distributed around the country, than they did with teachers in their own schools. Based upon responses to the qualitative portion of this study, I would hypothesize that the spike exists because of the success of statewide organizations, and because of the failure of school administrations to support local level teacher networking.

Some additional hypotheses based on the results of this study are described below.

This study found a number of statistically significant differences in the responses of teachers, by gender, highest educational level attained, and year's of full time experience. This study also found a number of extreme similarities by these same categories. These findings are primarily intended to suggest useful hypotheses for future studies.

Some light can be shed on the range of teachers' experience of why their sense of isolation may be different between groups of other teachers. These responses can be organized into a subset of Schwab's Four Commonplaces of Education: Teacher (Attitude/Philosophy), Subject matter (Nature of Communication), and Milieu (Organization, Frequency/Time).

Motivation to seek professional connection, as well as teachers' experience of isolation as a positive influence can be understood by arranging the participants' responses into a category system based upon Schwab's Four Commonplaces of Education as modified by Novak. This analysis is intended to serve two purposes. First, the analysis gives the reader a sense of the range of the teachers' experience. Second, the analysis serves as an argumentation resource: if a teacher wanted to convince other teachers or administrators to fund a program designed to enhance professional connection, they can find some teachers' own words which resonate with their local needs, and build a persuasive argument from there.

Professional Isolation can be seen as a two stage phenomenon. 'Lack of Time' comes first. It is the most frequently cited major source of isolation no matter how the data is recoded. 'Lack of time' then creates conditions which are necessary for the other sources of isolation to exist. For instance, if 'Lack of time' were less of a problem, teachers might have more time to create informal teacher networks and support groups.

Similarly, Professional Connection might be viewed as a two stage phenomenon. 'Friendship' is the most frequently cited major source of connection. Close behind, 'Teacher-teacher collaborations' comes out as the

third most frequently cited major source of professional connection. This suggests that if conditions can be created in which teachers can be friends with each other, and if teachers can be encouraged to collaborate together, the rest will follow. Whether the collaborations are formal or informal is likely to be less important than whether the collaborations happen at all, and what form they take will likely depend on the needs of each school.

Theoretical Implications of the Research

   The Role of Knowledge in a Distributed Education System

   The completion of this study makes it possible to suggest a way that the role of knowledge in a distributed education system can be mapped onto the five commonplaces of education. As will be seen, this extension of the theory of meaningful learning would suggest major changes in the way that education is structured, but at the same time enhances elements which often serve as the reasons teachers enter the education profession in the first place.

   The five commonplaces of education can be thought of as positions on a pentagon. They have been drawn as such in Figure 12.
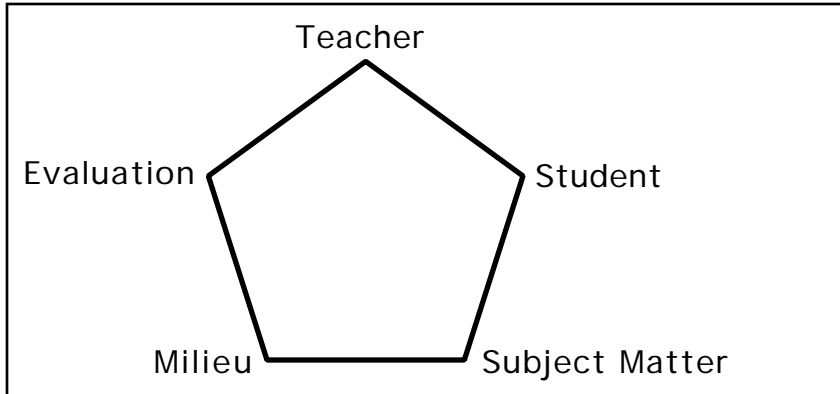
Figure 12: The Five Commonplaces of Education displayed as a Pentagon.

The role of knowledge as it relates to each of the five commonplaces can be viewed from the perspective of each position.

<u>The Perspective of the Teacher</u>
Teacher

The teacher knows the practice or craft of teaching.

Student

The teacher knows the student, for the student's sake.

Subject Matter

The teacher knows a subject matter for her (the teacher's) own sake, not because the students need to know that subject matter.

Milieu

   The teacher has knowledge of the sources of assistance which exist outside the classroom and knows how to access those sources of assistance.

Evaluation

   The teacher has knowledge of and participates in evaluation, which is a specialized form of assistance which allows knowledge in all five positions to be improved.

<u>The Perspective of the Student</u>

   The role of knowledge from the student perspective can be achieved by transforming the student position into the teacher position. In other words, to get the most out of their learning, students should also have the opportunity to teach. Alternatively, the perspective of the student can be envisioned through the negotiation of shared meaning.

Student

   The student knows how to negotiate meaning

Teacher

   The teacher is the primary helper with whom the student negotiates meaning.

Subject Matter

The subject matter provides the context and the language in which meaning is negotiated.

Milieu

The milieu consists of secondary sources of assistance with whom the student can negotiate meaning.

Evaluation

The student's negotiation of meaning, especially that of advanced students, can contribute to the evaluation of education, in any or all of the five positions.

<u>The Perspective of the Milieu</u>
Milieu

If the milieu is thought of as a universe of assistance, then it is possible to think of the milieu through the metaphor of a ballroom dance event. In such an event, there are people with a range of knowledge (skill). The people have a collective need to improve the group's skill because the more skill the group has, the more enjoyable the event will be for each person.

Teacher

The role of the teacher is to have a well developed grasp of the knowledge the milieu needs, and to organize that knowledge so that it is accessible.

Student

The role of the student is to implement the collective responsibility of the milieu. This requires being willing to teach when dancing with someone with less skill, and being willing to ask for assistance (a willingness to be vulnerable) when dancing with someone with more skill.

Subject Matter

The role of the subject matter is to be appreciated, because without it, the milieu couldn't exist.

Evaluation

The milieu has knowledge of and supports evaluation, which is a specialized form of assistance which allows knowledge in all five positions to be improved.

The Perspective of the Subject Matter
Subject Matter

Subject matter is usually thought of as text, especially in standard classroom situations. However, if the subject matter is conceived of as the

authors of the text, it becomes possible to see subject matter as a perspective. The role of the subject matter is to assist the teacher out of the subject matter's own self-interest.

Teacher

The role of the teacher is to prepare students for possible entry into the ranks of the subject matter.

Student

The role of the student is to enter the ranks of the subject matter, or to become a supporter of the subject matter, which in essence means entering the ranks of the milieu, and at any rate, entering the ranks of the milieu by which the subject matter would like to be surrounded.

Milieu

The role of the milieu is to create conditions which are conducive to students learning the subject matter, and which are conducive to the work of the subject matter itself.

Evaluation

The subject matter has knowledge of and participates in evaluation while acknowledging the expertise of the teacher in the discipline of education.

The Perspective of evaluation

I have not been able to achieve clarity with regards to how the role of knowledge could be described from the perspective of evaluation as yet. The best I can do at present is to understand evaluation as a kind of dual catharsis. There is a long running debate in the theatre community over whether Aristotle's term "catharsis" should be translated as "catharsis with the action" or "catharsis from the action". The "with" position is generally associated with Stanislavski, and involves getting the audience to learn from a play by feeling what the characters on stage feel. The "from" position is generally associated with Meyerhold and Brecht, and involves getting the audience to put some distance between themselves and the characters on stage. In the "from" position, the audience learns from the play because the distance allows them to analyze what the play is presenting.

It is possible to make at least a rough analogy between these two approaches to theatre and these two general schools of evaluation. Traditional quantitative evaluation tries to be as objective as possible so as to understand the phenomenon under study. Interpretive qualitative evaluation tries to understand the phenomenon by understanding how the participants think and feel when interacting with the phenomenon. The most extreme form of this kind of evaluation is intensive ethnography.

With this duality in mind, I would argue that the role of evaluation is to inform the participants that both kinds of evaluation can have value, and to set a tone for the evaluation which is respectful, yet critical.

Discussion of the Role of Knowledge

The role of knowledge in the Student position in the Teacher perspective is consistent with student related responses to the question "Has isolation ever been a positive influence for your teaching?". It is also consistent with a basic tenet of meaningful learning, that teachers need to discover what their students already know and teach from there.

The role of knowledge in the Subject Matter position is based upon the assumption that the days when it was possible for one person to know everything are long gone. Furthermore, if the knowledge needed by each person is determined by each person's prior background and future goals, then, while it is likely that some common corpus of knowledge will be learned by groups of students, the knowledge needs of each student will lead to a much greater diversity of knowledge than is typically found in today's classrooms. Thus, both societal and learning constraints make it impossible to prepare teachers to know everything their students will need to learn, even within the boundaries of traditional subject areas. It should be possible to get around this problem by making subject matter something which teachers learn for their own sake.

In order to keep their knowledge of the craft of teaching, their understanding of the likely and specific needs of students, and their slice of the subject matter fresh, teachers should be paid to seek assistance. In the process of seeking such professional connection, they will become scholars. As scholars committed to theory-driven research (likely locally specific, rich theories of their region, community, school, and students) and locally

relevant curriculum development, they should be paid to devote a minimum of 10% of their time to such scholarship. To make this proposal sound reasonable, I will be my own radical, and suggest that teachers should be paid 50% time to teach and 50% time for scholarship.

   Students, ideally, would choose to work with specific teachers because their interests and needs overlap with the interests of those teachers. Even without the luxury of choosing their teachers, a milieu of assistance (to other teachers as well as other types of professionals) should allow teachers to connect the students to knowledge outside of the teacher's expertise on an as needed basis. Students would enroll in specific subjects as much for the purpose of learning their teachers' love of learning as they would enroll for the purpose of learning that specific information.

   The role of knowledge from the Milieu position is dependent upon having a framework such as professional connection because Milieu, in the five commonplaces of education, has traditionally been thought of as the universe of obstacles to learning which exist outside of the classroom. In other words, the Milieu has been thought of primarily as the political context in which education occurs, rather than a community of potential assistance.

   The final three perspectives (Milieu, Subject Matter, Evaluation) are not, strictly speaking, roles of knowledge. Nonetheless, they do provide multiple perspectives on the nature of assistance in schools.

Implications of this study for the Principles of Meaningful Learning

Over the course of his career, Novak has developed an extensive, and integrated theory of education(Novak, 1977). The respect that is accorded this theory should be evident from the large number of students and colleagues who have built upon Novak's theoretical foundation over the years. The concise version of this theory can be found in Novak's 47 Principles of Meaningful Learning. This section looks at nine of these Principles and shows how results from this dissertation relate to each of those principles. In doing so, one can find both a deeper understanding of the Principles, as well as a deeper understanding of the results.

Principle Number 2: "Every educative event involves five elements: (1) the learner; (2) the teacher (or vicarious teacher); (3) subject matter; (4) context; and (5) evaluation." (Novak, 1995)

Please see The Role of Knowledge in a Distributed Education System above for a discussion of this principle.

Principle Number 16: "Context has a strong influence on learning and transfer of learning." (Novak, 1995)

The data in this study describe a context in which teacher to teacher learning can occur.

Principle Number 21: "High levels of meaningful learning require high commitment." (Novak, 1995)

"High participation in professional organizations" was cited by 14.8% of the participants as a major source of professional connection. Participation in a professional organization is one example of commitment to learning.

Principle Number 27: "Instruction should be planned through careful analysis (including concept mapping and/or Vee diagramming) of relevant knowledge." (Novak, 1995)

"Lack of planning periods" was cited by 19.7% of the participants as a major source of professional isolation, and "Planning periods" was cited by 13.1% of the participants as a major source of professional connection. Careful instructional planning requires that time be budgeted for this work.

Principle Number 31: "Cooperative learning strategies are effective." (Novak, 1995)

"Lack of teacher-teacher collaborations" was cited by 26.2% of the participants as a source of professional isolation, while only 22.1% of the participants cited "Teacher-teacher collaborations" as a source of professional connection. "Lack of peer observations (observing each others' teaching) was cited by 13.1% of the participants as a source of professional isolation, while only 5.7% of the participants cited "Peer observations

(observing each others' teaching)" as a source of professional connection. If cooperative learning strategies are effective, cooperative learning for teachers, and by extension, cooperative teaching, should also be effective. As can be seen from the results, there is still much room for improvement. On a positive note, only 3.3% of the participants cited "The attitude that the teacher is supposed to be an expert who shouldn't have to ask for help" as a major source of professional isolation.

Principle Number 43: "Highly effective teachers work from strong theoretical foundations." (Novak, 1995)

"Differences in educational philosophy" were cited by 20.5% of the participants as a major source of professional isolation, and was cited by 0% of the participants as a major source of professional connection. Thus, more could be done to encourage discussion across philosophical boundaries. Such discussion should result in more robust theoretical foundations.

Principle Number 45: "Effective teaching is very demanding in time and personal energy." (Novak, 1995)

"Lack of time" was cited by 60.2% of the participants as a major source of professional isolation. If we assume that the participants represent the full range of teaching effectiveness, this result then reemphasizes the need for schools to budget sufficient time so their teachers can be effective. If instead

we assume that the participants are all effective teachers, then this result provides confirmation of the principle.

Principle Number 46: "Constructive caring for others requires honesty, openness, and commitment to understand other's cognitive and affective concerns." (Novak, 1995)

"A feeling that administration does not nurture or care about teachers" was cited by 30.6% of the participants as a major source of professional isolation. "Lack of trust (between teachers and teachers or administrators)" was cited by 27.9% of the participants as a major source of professional isolation. Thus schools have not done as much as they might to create a high quality affective work environment.

On the other hand, 14.9% of the participants cited "A feeling that administration nurtures and cares about teachers" as a major source of professional connection. This means that there are models which could be emulated. The 38.5% of participants who cited "Friendship" as a major source of professional connection is also a positive sign.

Principle Number 47: "Survival of human life on Earth is probably dependent upon radically improved educational practices." (Novak, 1995)

Only 6 teachers (5.2% of the participants) indicated that they have productive relationships with teachers who work in other countries. Given

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that many of the armed conflicts in today's world are fought over historical or politically encouraged ethnic hatreds, any effort to help teachers from around the world know each other as people, and by extension, such efforts which extend to helping their students know each other as people, can only help. This suggestion encompasses, but is broader than the cultural exchanges which occured between the United States and the former Soviet Union. Today's armed conflicts often occur between people who live together and who speak the same language. The suggestion is based upon the hope (perhaps an overly optimistic hope, but without optimism, what is the point of being an educator?) that if members of both flagged groups involved in an intra-country conflict make the effort to create shared meaning across distance and language barriers, such efforts will have at least some influence on their ability to create shared meaning between each other.

Suggested Future Research

The results from this study can be said to be representative of the region studied because a thorough response rate strategy was used which ensured that the response rate achieved is probably as high as anyone could have achieved. Admittedly, I would have preferred a overall response rate of 50% or better, but this report contains the best data of its kind currently available. Because of this, and because an exhaustive geographic sample was used, the results do not reflect the influence of any one program, and thus should be usable as a baseline.

An education organization could administer the survey used for this study to a population of their participants. By comparing the results from their participants with the baseline results, the education organization would be able to assess whether their population is similar to or different from the baseline. Suppose that an education organization is conducting a program in which a component is a computer network. If the program was successful, one might expect "Lack of computer networks" as a source of professional isolation to be less than 24.6%, and one might expect "Computer networks" as a source of professional connection to be higher than 6.6% (8 teachers out of 122 in the study reported that "Computer networks" were a source of professional connection).

Other future research could include a question such as "Suggest reasons that a teacher network in your local region (such as your county) might be beneficial, suggest obstacles you might encounter when trying to establish such a network, and suggest strategies you might use to establish such a network."

Several investigations would be possible which test the hypotheses generated from Tables 17-28, analysis of quantitative data by characteristics of teachers.

A study of gender in the teaching workforce might profitably include questions which touch upon the connection between professional isolation & connection, and the role of friendship, responsibilities to family, and the emotional impact of community and administration attitudes.

A study focusing on teachers' educational level might profitably investigate the relationship between interdisciplinary teaching practices and educational level. It would also be interesting to see a study of the marginal benefit that teachers attribute to effort put into different sources of professional connection.

If a researcher was interested in probing the results based upon years of full time teaching experience one might ask, is there a difference between the professional isolation and connection as experienced by novice versus experienced teachers? Zachmeier did not find evidence for such a claim. (Zachmeier, 1969) Stevens found that "Isolation is the one element of alienation which appeared to be dominate in the perceptions of teaching by subjects of this study [beginning teachers]." (Stevens, 1992, p. 128) This study found results which concur with Stevens' results. For instance, teachers who have been teaching for 0-3 years (60.0% of such teachers) are more likely to have relationships with colleagues in other school districts and their own subject that are primarily characterized by isolation than are teachers with 4-35 years of experience (35.7% of such teachers) (although $p = 0.07243$). In a result with a smaller p value, teachers with 0-5 years of experience were less likely to have productive relationships with teachers in "other parts of New York State".

This study also found evidence which runs counter to Stevens' claim. Teachers with 0-3 years of experience were equally likely as teachers with 4-35 years of experience to have relations with colleagues in "my own school district, and my subject" characterized by connection. Teachers with 0-5 years of experience and teachers with 6-35 years of experience were equally

likely to have relations with colleagues in "other school districts, but other subject" primarily characterized by isolation. The same result holds for this category when the teachers are broken down into a group with 0-5 years of experience, 6-20 years of experience, and 21-35 years of experience.

Experienced teachers are more likely to have experienced many of the sources of professional isolation, but this may have more to do with the possibility that a longer time in the teaching profession has given these teachers more opportunities to be exposed to such conditions than it does with the possibility that experienced teachers are more isolated overall.

Open-ended research projects could be conducted which describe each source of isolation and connection. Taken together, such projects could create a guidebook for teachers who wish to implement improved professional connection.

So What?

As Dr. Verne Rockcastle often admonishes at the beginning and end of a research project, "So what?" What are the practical implications of the data? In this section, I highlight six such implications.

1) How has Professional Isolation made you a better teacher?

Professional Isolation has had positive effects in that it gives teachers an opportunity to develop a teaching repertoire in which they have confidence, and isolation gives them the autonomy to make decisions about which of the competing approaches and subject matters will best benefit their

students. On the other hand, it is also clear that the benefits of this experimentation can never be fully realized, both for individual teachers and for the profession as a whole, if they are not shared. There are several theoretical ideas which could help reconcile the best of the existing tendency of development by trial and error with the best of coordinated group action. These ideas include the hypothesis that innovation progresses as an S-curve: that an extended period of small improvements can be followed by a period of dramatic growth (Petzinger, 1997); the hypothesis that extended experimentation in the early stages of a problem-solving activity generally results in a better solution in the end (Hodges, 1996); the hypothesis of tipping points, first developed in epidemiology and now used in crime prevention, which describes phenomena where results are relatively stable despite major changes to a critical factor except at the tipping point where minor changes to a critical factor cause very large changes in the results (Gladwell, 1996); the theory of policy governance, a form of management for non-profit corporations (Carver, 1990); and the hypothesis that the width of a person's Zone of Proximal Development affects how they learn (van der Veer & Valsiner, 1991). Such a reconciliation would give teachers acknowledgement for the development they already do, and would give them the autonomy needed for this development by design rather than as a by-product of neglect.

 2) Avoid policies that make it difficult to have friendships.

Schools should pursue policies which facilitate the formation of friendships among teachers, not primarily because of the intrinsic value of warm fuzzies, but because friendship is an important source of professional

connection. A teacher who is friends with other teachers is more likely to seek help from and provide help to other teachers, which means that it is more likely that the benefits from a school's investment in professional development will be multiplied, and that it is more likely that students will receive the help they need.

3) Encourage teachers to go to state conferences (a small investment), and provide facilitated follow-up (to capitalize on that investment).

"State or National conferences" was the second most frequent source of professional connection. This is also reflected in the relatively strong showing of "Other parts of New York State" in the question about productive relationships with teachers who work in a series of regions. As the open ended responses reveal, it can be a rejuvenating experience. Schools should be strongly encouraged to send their teachers to conferences, especially state conferences. For a minimal investment, the school would obtain access to a broad field of assistance. To capitalize on this investment, schools should encourage continued professional interaction, such as through a Professional Development School or a county-based organization.

4) Encourage county-based organizations to develop opportunities for teachers to utilize each other as sources of assistance.

There were fewer teachers who had productive relationships with teachers who work in other parts of their county. This suggests that there is an opportunity for county-based organizations to capitalize on their existing efforts by facilitating the on-going local dialogue and collaboration of local teachers. This could include the structured inclusion of teachers in such

organizations' existing projects, as well as the local sponsorship of existing statewide education projects, such as CIBT.

5) Capitalize on the prevalence of productive relationships in teachers' own schools by explicitly linking such intra-school communities with one or more inter-school communities.

Of the 123 teachers participating in this study, 107 reported productive relationships with teachers in their own school. This is much better than I was expecting. Schools should take up the challenge of examining what elements compose a productive relationship, and how can these elements be supported so as to help teachers get the most out of the inter-school communities in which they participate.

6) Budget time for teachers to connect with each other. Such connection should be required or strongly encouraged, but the form of the connection should be an autonomous teacher-level decision.

Lack of time was the most frequently cited source of professional isolation. It is critical that time be budgeted so that teachers can obtain the help they need when they need it. Anything less is a disservice to the teachers and the students in their care.

For now though, it is enough to return to the beginning in order to seek an answer to one teacher's prediction. This teacher asserted that teachers aren't isolated anymore. (Gerber, 1992, p. 228) It is now possible to answer that, yes, more high school science teachers in upstate New York have relationships with other teachers characterized by connection than isolation. However, as the low frequency of sources of connection relative to sources of isolation reveal, there is much room for improvement. Fortunately, the success that teachers have had in creating such connection contains a seed which can help others in the education community grow towards more meaningful and exemplary teaching and learning.

Appendix A - The Survey

From Professional Isolation to Connection

    I am working on my Ph.D. in Education today because I was fortunate enough to have studied with a series of great teachers. I see my work as a small way that I can give something back to education: by looking for ways to create better schools.

    When I have talked to other teachers, I have found that *how* teachers experience professional isolation and/or connection is important to the improvement of schools. I would like to know how you experience professional isolation and/or connection.

    Your responses to this survey will be confidential and your name will not appear in the final report. Also, results of this survey will not be reported by school district name.

    Thank you for helping me by taking the time to fill out this survey.

Sincerely,

        Robert Abrams

General Instructions

1) Please sign the consent form.
2) Fill out the survey
3) If you are willing to answer some follow-up questions, please fill out a follow-up sheet.
4) Seal both the survey and the follow-up sheet in the envelope provided.
5) Put your consent form in the consent form envelope. (You can keep the cover letter.)

If you have any concerns about this project at any time, you may communicate your concerns -- anonymously, if desired -- to either:

Robert Abrams
Principal Researcher
Education Department
Kennedy Hall, 4th Floor
Cornell University
Ithaca, NY 14853
607-255-9830
e-mail: rha2@cornell.edu

-- **or** --

Dr. Joseph Novak
Education Department
Kennedy Hall, 4th Floor
Cornell University
Ithaca, NY 14853
phone: 607-255-3005

Participation Consent form

I am conducting a study of professional isolation and connection.

Signing this form gives permission for me to include your responses to the survey in my data set. Some materials produced by the study may be included in the final report.

I will make every effort to ensure the confidentiality of your responses. Your name will not appear in the final report. Aggregated data will not be reported by name of school district.

If you have any concerns about this project at any time, you may communicate your concerns -- anonymously, if desired -- to either:

Robert Abrams
Principal Researcher
Education Department
Kennedy Hall, 4th Floor
Cornell University
Ithaca, NY 14853
607-255-9830
e-mail: rha2@cornell.edu

-- or --

Dr. Joseph Novak
Education Department
Kennedy Hall, 4th Floor
Cornell University
Ithaca, NY 14853
phone: 607-255-3005

Participant Signature   _____

From Professional Isolation to Connection - A Survey

1) Please mark if the following have ever been a source of professional <u>isolation</u> for you in the past ten years. If an item is not applicable to you, please check "Not a Source." These items were all suggested by teachers; if you know of other sources that haven't been suggested yet, please describe them at the end of this list.

Major Source	Minor Source	Not a Source	Possible Sources of Professional Isolation
		✔	*EXAMPLE (Check one box to the left of each possible source.)*
			A feeling that administration does not nurture or care about teachers
			A feeling that as a teacher you are overworked
			A feeling that my teaching job is a grunt job
			Age
			Autonomy
			Being a bilingual teacher or teaching bilingual students
			Being the only teacher for a subject matter in your school
			Boredom
			Community attitudes
			Differences in educational philosophy
			Family obligations
			Gender
			Geographical distances
			Inclement weather
			Lack of autonomy
			Lack of computer networks
			Lack of informal teacher networks or support groups
			Lack of money
			Lack of peer observations (observing each others' teaching)
			Lack of planning periods
			Lack of substitute teachers
			Lack of successful orientation or mentor program for new teachers
			Lack of teacher-teacher collaborations
			Lack of tenure or job security
			Lack of time
			Lack of trust (between teachers and teachers or administrators)
			Lack of university courses for teachers offered at your school site
			Limited professional dialogue, such as teachers talking to each other about administrative problems, but not about their subject matter
			Logistical problems
			Low participation in professional organizations
			Other teachers' lack of interest in trying new approaches
			Paperwork
			Race
			Staffing structure (such as lack of secretarial support for teachers)
			The attitude that the teacher is supposed to be an expert who shouldn't have to ask for help
			The curriculum I am expected to teach
			The layout of your school's instructional space, such as teachers' spending most of the day in one classroom
			Other:

2) Please mark if the following have ever been a source of professional <u>connection</u> for you in the past ten years. If an item is not applicable to you, please check "Not a Source." These items were all suggested by teachers; if you know of other sources that haven't been suggested yet, please describe them at the end of this list.

Major Source	Minor Source	Not a Source	Possible Sources of Professional Connection
		✔	*EXAMPLE (Check one box to the left of each possible source.)*
			A feeling that administration nurtures and cares about teachers
			Age
			Autonomy
			Being a bilingual teacher or teaching bilingual students
			Community attitudes
			Computer networks
			Continuing communication with classmates from your teacher education program
			Differences in educational philosophy
			Family
			Friendship
			Gender
			Geographical distances
			High participation in professional organizations
			Informal teacher networks or support groups
			Lack of autonomy
			Money
			Other teachers' interest in trying new approaches
			Parents who volunteer in the school
			Participation in a Professional Development School or Partnership
			Peer observations (observing each others' teaching)
			Planning periods
			Race
			Similarities in education philosophy
			Staffing structure (such as secretarial support for teachers)
			State or national conferences (STANYS, NAAEE, etc.)
			Successful orientation or mentor program for new teachers
			Teacher's aides
			Teacher-teacher collaborations
			Tenure or job security
			The curriculum I am expected to teach
			The layout of your school's instructional space
			University courses offered at your school site
			Other:

Note about Question 3: "my subject" in Question 3 refers to general subject areas, such as Science. "What subjects do you teach?" in the Background section refers to specific subjects, such as Biology, Chemistry, etc. "My own school" refers to your division of a school, such as the high school.

3) My relationship with colleagues in *[Example category]* is primarily characterized by:

	Strong Connection	Some Connection	Neutral	Some Isolation	Strong Isolation
[Example category]		✔			
my own school, and my subject					
my own school, but other subjects					
my own school district, and my subject					
my own school district, but other subjects					
other school districts, and my subject					
other school districts, but other subjects					

4) Please pick one of the items that you checked as a major source of professional isolation (in Question 1) and describe why it is a major source of isolation.

5) Please pick one of the items that you checked as a major source of professional connection (in Question 2) and describe why it is a major source of connection.

6) If your relationships (connection/isolation) with other teachers differs between your colleagues in your own school and colleagues elsewhere (in Question 3), please suggest reasons for this difference.

7) What motivates you to seek professional connection?

8) Has isolation ever been a positive influence for your teaching? If yes, please describe the circumstances.

9) The teachers with whom I have productive relationships work in: (circle all that apply)

My school   Other parts of my school district   Other parts of my county

Other parts of New York State   Other parts of the US   Other countries

---

Background Information

Gender: ____   **What grades do you teach?**

Year of Birth: ____   1   2   3   4   5   6   7   8   9   10   11   12

Highest Educational Level Attained: **What subjects do you teach?**

BA/BS   Masters   Masters+30 hours or more

Years of Full-time Teaching Experience: ___

You can use the rest of this page to continue your answers to the questions, if desired.
Thanks again for your help with this survey.
▼ ▼

Professional Isolation & Connection Survey - Optional Follow Up Sheet

I am interested in exploring the issue of professional isolation and connection in more depth than a survey allows. If you are interested in assisting me with this second stage of my research, please fill out the information below and include this sheet with your survey in the envelope. I will get in touch with you later this semester. Follow up may consist of additional written questions, face to face interviews, or hands-on projects. The exact nature of the follow up will depend on the results of the surveys, as well as the preferences of the people who wish to participate.

Name: _____

Address: _____

           _____

Phone: _____

Email: _____

Instruction sheet for the Professional Isolation to Connection Survey

Question 1) In the course of developing my survey, I have had the opportunity to talk with teachers in both New York and California. Nearly all of them have agreed that professional isolation affects themselves or teachers around them, and that the topic deserves detailed study.

Based on my discussions with teachers and my reading of the literature, I define
<u>Professional Isolation</u> as *"A condition characterized by a teacher having a limited ability to seek the help of other people in solving problems or challenges of a professional nature, and where this limited ability interferes with a teacher's efforts to meet his or her goals. These goals, stated in an admittedly simplified form, are to create an effective learning experience for each student, and to achieve job satisfaction."*

In the course of developing the survey, the teachers I have talked with have suggested a very wide range of possible sources for this professional isolation. Since this is the first comprehensive study of professional isolation, it is extremely important to investigate how widespread the isolation is, and what sources are most important. For instance, it is likely, that the major sources of isolation would be different in a small rural school than a large urban school.

Please review the list of possible sources in Question 1 and place a check mark next to each source to indicate whether it has been a major source of professional isolation for you, a minor source, or not a source. I am aware that the words, however carefully crafted, can have somewhat different meanings for different people. I have crafted the descriptions of the possible sources based upon teachers' own wording, so please respond as best you can. There is room to expand upon the nuances of the various sources in Question 6.

If you have experienced a source of professional isolation which is not on the list, please describe it at the end of the list in the "Other" box.

Question 2) <u>Professional Connection</u> is the flip side of professional isolation. It could be described as, *"A condition characterized by a teacher having a supported ability to seek the help of other people in solving problems or challenges of a professional nature, and where this supported ability enhances a teacher's efforts to meet his or her goals. These goals, stated in an admittedly simplified form, are to create an effective learning experience for each student, and to achieve job satisfaction."*

The list of possible sources of professional connection was developed partly by asking teachers to describe successful examples of connection, and also by taking the isolation sources and imagining what their connection counterparts would look like.

Once again, it would be extremely useful to know how widespread various sources of professional connection are. Please put a check mark by each source indicating whether it has been a major source of professional connection for you, a minor source, or not a source. Also, if there are sources you have experienced that aren't on the list, please write them in the "Other" box.

Question 3) In the course of my work, I have had the opportunity to meet with some of the organizers of TERC's LabNet project. (TERC is an independent curriculum development and research group in Cambridge, MA.) LabNet started as a project to develop and disseminate biology and physics curricula. As part of this project, TERC created a computer network which participating teachers could use to download curricula and converse with each other about their work. The folks at TERC found that in many cases, their teachers experienced a greater sense of community with the LabNet teachers (who are distributed around the entire United States), than they did with other teachers in their own schools or

school districts. It would be extremely valuable to know to what extent this somewhat unexpected phenomenon exists in a broader population of teachers.

Please place a check mark indicating the degree of isolation or connection you feel with regards to the six categories of teachers listed in Question 3.

Question 4) I am a researcher who believes that the best research allows and encourages teachers to describe a phenomenon in their own words, rather than forcing teachers to fit their responses into the researcher's predefined categories. The richest way to do this is in-depth interviewing. However, interviewing takes a large amount of time. In order to conserve your time,I have tried to create a balance between keeping the survey short, and encouraging open-ended responses.

Please use the space in Question 4 to describe one of the major sources of professional isolation, which you picked in Question 1, in some detail. Why is it a major source? Is there an example you could describe? Any response from a couple of sentences to a few paragraphs would be greatly appreciated.

Question 5) Question 5 is the same as Question 4, except that it follows up on a major source of professional connection you picked in Question 2.

Question 6) Please provide some thoughts on reasons for differences (or similarities, for that matter) in the amount of isolation or connection between various categories.

Question 7) Again, a few thoughts on what motivates you to seek professional connection would be appreciated.

Question 8) Isolation can be a positive influence. Your response to this question will help me paint a full and balanced portrait of professional isolation and connection.

Question 9) I am curious to know where the teachers with whom you have productive relationships work.

Optional Follow-up Sheet) I hope to follow up this portion of my study with a few teachers in more depth. This will likely be either a second questionnaire, or a face to face interview. If you are willing to participate in the follow-up, please complete the follow-up sheet. Filling out a follow-up sheet does not obligate you to participate in the follow-up portion, and if you do not fill out a follow-up sheet now and you change your mind later, you can always contact me directly.

I am more than grateful for your participation in this initial survey.

I plan to send all participating departments a summary of the results of my study once it is complete. In addition, I have been working on a number of projects that might interest you. These include expertise with both computers (concept mapping programs, World Wide Web site construction, CD-ROMs), and the use of theatre as environmental education. If I can be of assistance in any of these areas, please let me know. Finally, in light of the recent federal cutbacks in education, I have been looking for alternate sources of funding for both education and educational research. I have recently had some success in this search which I can pass along to participating teachers. Tom's of Maine, a manufacturer of natural personal care products, has kindly donated discount coupons to my research project. Please let me know if you would like one of these coupons.

Once again, thank you very much for participating in my study.

Sincerely,

Robert Abrams

Appendix B - Index to Variable Names

In the following version of the survey used for this study, variable names are written into the cell next to each item label.

1) Please mark if the following have ever been a source of professional <u>isolation</u> for you in the past ten years. If an item is not applicable to you, please check "Not a Source." These items were all suggested by teachers; if you know of other sources that haven't been suggested yet, please describe them at the end of this list.

Major Source	Minor Source	Not a Source	Possible Sources of Professional Isolation
		✔	*EXAMPLE* *(Check one box to the left of each possible source.)*
		Q101	A feeling that administration does not nurture or care about teachers
		Q102	A feeling that as a teacher you are overworked
		Q103	A feeling that my teaching job is a grunt job
		Q104	Age
		Q105	Autonomy
		Q106	Being a bilingual teacher or teaching bilingual students
		Q107	Being the only teacher for a subject matter in your school
		Q108	Boredom
		Q109	Community attitudes
		Q110	Differences in educational philosophy
		Q111	Family obligations
		Q112	Gender
		Q113	Geographical distances
		Q114	Inclement weather
		Q115	Lack of autonomy
		Q116	Lack of computer networks
		Q117	Lack of informal teacher networks or support groups
		Q118	Lack of money
		Q119	Lack of peer observations (observing each others' teaching)
		Q120	Lack of planning periods
		Q121	Lack of substitute teachers

		Q122	Lack of successful orientation or mentor program for new teachers
		Q123	Lack of teacher-teacher collaborations
		Q124	Lack of tenure or job security
		Q125	Lack of time
		Q126	Lack of trust (between teachers and teachers or administrators)
		Q127	Lack of university courses for teachers offered at your school site
		Q128	Limited professional dialogue, such as teachers talking to each other about administrative problems, but not about their subject matter
		Q129	Logistical problems
		Q130	Low participation in professional organizations
		Q131	Other teachers' lack of interest in trying new approaches
		Q132	Paperwork
		Q133	Race
		Q134	Staffing structure (such as lack of secretarial support for teachers)
		Q135	The attitude that the teacher is supposed to be an expert who shouldn't have to ask for help
		Q136	The curriculum I am expected to teach
		Q137	The layout of your school's instructional space, such as teachers' spending most of the day in one classroom
			Other:

2) Please mark if the following have ever been a source of professional connection for you in the past ten years. If an item is not applicable to you, please check "Not a Source." These items were all suggested by teachers; if you know of other sources that haven't been suggested yet, please describe them at the end of this list.

Major Source	Minor Source	Not a Source	Possible Sources of Professional Connection
		✔	*EXAMPLE (Check one box to the left of each possible source.)*
		Q201	A feeling that administration nurtures and cares about teachers
		Q202	Age
		Q203	Autonomy
		Q204	Being a bilingual teacher or teaching bilingual students
		Q205	Community attitudes

		Q206	Computer networks
		Q207	Continuing communication with classmates from your teacher education program
		Q208	Differences in educational philosophy
		Q209	Family
		Q210	Friendship
		Q211	Gender
		Q212	Geographical distances
		Q213	High participation in professional organizations
		Q214	Informal teacher networks or support groups
		Q215	Lack of autonomy
		Q216	Money
		Q217	Other teachers' interest in trying new approaches
		Q218	Parents who volunteer in the school
		Q219	Participation in a Professional Development School or Partnership
		Q220	Peer observations (observing each others' teaching)
		Q221	Planning periods
		Q222	Race
		Q223	Similarities in education philosophy
		Q224	Staffing structure (such as secretarial support for teachers)
		Q225	State or national conferences (STANYS, NAAEE, etc.)
		Q226	Successful orientation or mentor program for new teachers
		Q227	Teacher's aides
		Q228	Teacher-teacher collaborations
		Q229	Tenure or job security
		Q230	The curriculum I am expected to teach
		Q231	The layout of your school's instructional space
		Q232	University courses offered at your school site
			Other:

3) My relationship with colleagues in _[Example category]_ is primarily characterized by:

	Strong Connection	Some Connection	Neutral	Some Iso-lation	Strong Iso-lation
[Example category]		✔			
my own school, and my subject	Q301				
my own school, but other subjects	Q302				
my own school district, and my subject	Q303				
my own school district, but other subjects	Q304				
other school districts, and my subject	Q305				
other school districts, but other subjects	Q306				

9) The teachers with whom I have productive relationships work in: (circle all that apply)

     Q901 My school

     Q902 Other parts of my school district

     Q903 Other parts of my county

     Q904 Other parts of New York State

     Q905 Other parts of the US

     Q906 Other countries

Appendix C

The Exemplary Teacher - Presented as Basic Manual Speech #9, Speak with Knowledge, at the Ithaca Area Toastmasters Club

Suppose that you are about to send your child to a new school. What is the first question you ask? That question might be "What kind of teachers do they have inside the schoolhouse door?" I am here to suggest that your first question should be "What kind of teachers do I want?" The literature which investigates the qualities of exemplary teachers can help you answer this question.

What does it take to be an exemplary teacher?

I will compare the results of a study of Toastmaster members with the literature on exemplary teachers.

14 out of 23 club members responded to the following question.

"In your opinion, what are three qualities that an exemplary teacher must have? To answer this question, please think about any exemplary teachers you have had when you were in school, and think about what kind of a teacher you would want your kids to have when they are in school."

By summarizing those items which three or more members mentioned, the Toastmasters' view of an exemplary teacher can be described as follows:

Such a teacher would be knowledgeable. This teacher would teach students as individuals. This teacher would have respect for students, and thus would be both fair and openminded. The teacher would be caring.

The teacher would have enthusiasm and the ability to communicate that enthusiasm. The teacher would be willing to push the students. Finally, the teacher would be creative.

 The teacher that I have just described is thus a person who is capable of teaching in both the cognitive and the affective domains. Not only does this person have these abilities within themselves, they have the skill to bring such abilities to fruition in others.

 What have educational researchers said about the qualities that are necessary for an exemplary teacher? There are similarities in three areas.

 The first category that can be found in the literature is pedagogy. In the context of this category, Beisenherz, an education researcher, would agree with the Toastmasters that exemplary teachers perceive teaching as a creative process.

 In the category of skill, the experts are thinking along the same lines as the Toastmasters. Ladson-Billings stated that exemplary "teachers know the subject they teach and how to teach those subjects to students." Hofstein, another author, wrote that exemplary teachers have a "high awareness of individual progress."

 In the category of emotion, the experts agree that both internal and external emotion is important. Beisenherz said that exemplary teachers "demonstrate their enthusiasm in their teaching." This is an internal emotion because it is about the teacher herself. Ladson-Billings said that

teachers are committed to students and their learning. This is an external emotion, caring, because it is directed towards another person.

In addition to the three areas of similarity, there are two areas of difference.

There is one quality which can be found in the literature, and which the toastmasters left out. This quality is "community." Ladson-Billings said that exemplary "teachers are members of learning communities." Beisenherz, concurs. He wrote that exemplary teachers "are aware of successful programs and approaches. They demonstrate leadership and commitment by active participation in professional organizations, offering workshops and presentations, working as a mentor with other teachers, and by working with student teachers." After all, if Toastmasters were to start a school and thus need to hire some exemplary teachers, we would want to help our terrific teachers stay terrific. What better way to do this than to help them communicate with other teachers?

The toastmasters suggested one quality which does not appear in the literature. Toastmasters suggested that it was important for teachers to be willing to push their students in order to achieve their potential. This is a very important idea. If we are not afraid to demand the best from our teachers, then teachers should not be afraid to demand the best from their students.

I have asked you to reflect upon three important questions. First, what qualities do you want in a teacher? Second, how can the literature support your understanding of the exemplary teacher? Third, how can the literature

expand your understanding of the exemplary teacher, and similarly, how can a simple study of our views expand upon the experts' understanding?

I would like to leave you with one more important idea. If we truly want our teachers to be exemplary, if we truly want teachers who are knowledgeable, and who teach with enthusiasm and care about students as individuals, if we truly want teachers who push both themselves and their students to be the best they can be, then we must be willing to back up our teachers in both word and deed. We must be willing to bear the cost of staffing our schools so that teachers have the time to work with students as individuals, and not just rush from one overcrowded classroom to another. We must be willing to bear the cost of ongoing training for teachers so that they can stay current in their field. And finally, we must be willing to bear the cost of being partners in teaching with our teachers. We must insure that we construct our homes and conduct our relationships with our children so that learning is not something which stops at the schoolhouse door.

Appendix D - Vee Diagram

(Proposal Vee Diagram) FOCUS QUESTION:
How and why do teachers experience professional isolation?

THEORY	PRACTICE

THEORY

WORLD VIEW:
Constructivism: All teachers construct their concepts of exemplary practice.

PHILOSOPHY:
Everyone can learn. All teachers can be successful. All teachers can be exemplary. Even an exemplary teacher can become a better teacher, because the best can still chase themselves.

THEORY:
Meaningful learning.
Network Learning.

PRINCIPLES:
1. Knowledge is a human construction (Edmondson, 1989).
2. Meaningful learning requires shared meaning between teachers and students (Edmondson, 1989), and professional development requires shared meaning between teachers.
3. Students are responsible for learning (Edmondson, 1989), and therefore teachers and educational researchers must work together to create contexts in which students can take responsibility.
4. Humans think, feel, and act (Novak, 1995).
5. Context has a strong influence on learning and transfer of learning. (Novak, 1995)
6. High levels of meaningful learning require high commitment. (Novak, 1995)
7. Effective teaching is very demanding in time and personal energy. (Novak, 1995)

CONCEPTS:
Communities of Practice.
Professional Development.
Professional Connection.
Professional Isolation.
Innovation vs. Intervention.
Risk.
Motivation.
Failure.
Reflective Practice.

PRACTICE

VALUE CLAIMS (for the research):
1. Teachers' motivation to seek professional connection will reveal better ways to create a bridge from distal to proximate communities of practice.
2. Teachers' experience will reveal ways in which professional connection can be created at little or no additional cost.
3. Knowing the sources of professional isolation which teachers in a specific organization or school district feel are important will give the school community new and better entry to solutions for schools' complex problems.

(expected) KNOWLEDGE CLAIMS:
1. I expect teachers who desire connection to also desire ongoing learning.
2. I expect teachers who experience professional connection to be active in professional organizations.
3. I expect lack of time to be a major source of professional isolation.

TRANSFORMATIONS:
Look for patterns across the data, specifically ideas which reappear in many surveys so as to create a sense of saturation.
Describe themes that emerge.
Describe results which were not expected.
Concept map major ideas.
Count number of participants who mention specific sources of isolation or connection.
Tell the participants' stories.

RECORDS OF EVENTS:
Surveys.
Focus groups: notes from the focus groups.

EVENT:
Teachers' descriptions of how they experience professional isolation and connection.

Discussion of the Vee Diagram

In the past, I have had difficulty with Vee Diagrams because it felt as if I had to invent principles each time I created a Vee Diagram. As I was struggling with this Vee Diagram I stumbled upon a technique which makes creating it much simpler. I looked through the dissertations of Dr. Novak's former graduate students to find their Vee Diagrams. I then borrowed those principles that seemed relevant to my study. I then looked through Dr. Novak's revised handout on his complete set of principles of education, and chose a few that seemed to fit my study. There are other principles of education I subscribe to, but which didn't seem as directly relevant to this Vee Diagram. Finally, in those instances where it seemed appropriate, I expanded upon an existing principle of education.

This Vee Diagram was constructed at the beginning of the study as part of my dissertation proposal.

(End of Study Vee Diagram) FOCUS QUESTION:
How and why do teachers experience professional isolation?

| THEORY | PRACTICE |

THEORY

WORLD VIEW:
Constructivism: All teachers construct their concepts of exemplary practice.

PHILOSOPHY:
All teachers can learn from each other.

THEORY:
Meaningful learning.

PRINCIPLES:
1. Every educative event involves five elements: (1) the learner; (2) the teacher (or vicarious teacher); (3) subject matter; (4) context; and (5) evaluation.
2. Meaningful learning requires shared meaning between teachers and students (Edmondson, 1989), and professional development requires shared meaning between teachers.
3. Instruction should be planned through careful analysis (including concept mapping and/or Vee diagramming) of relevant knowledge.
4. Constructive caring for others requires honesty, openness, and commitment to understand other's cognitive and affective concerns.
5. Context has a strong influence on learning and transfer of learning. (Novak, 1995)
6. High levels of meaningful learning require high commitment. (Novak, 1995)
7. Effective teaching is very demanding in time and personal energy. (Novak, 1995)
8. Cooperative learning strategies are effective.
9. Highly effective teachers work from strong theoretical foundations.
10. Survival of human life on Earth is probably dependent upon radically improved educational practices.

CONCEPTS:
Communities of Practice. Professional Development. Professional Connection. Professional Isolation. Risk. Motivation. Reflective Practice.

PRACTICE

VALUE CLAIMS:
1. Increased support for teachers learning from each other should result in better schools.
2. Friendship is a pre-condition for attaining professional connection from other sources.
3. Schools should ensure that teachers' workload stays focussed on teaching, and professional development which improves teaching.
4. Statewide professional development efforts should be continued. Teachers should explore the development of county or BOCES-regional networks.

KNOWLEDGE CLAIMS:
1. Teachers seek connection because they desire ongoing learning.
2. Friendship is the most frequently cited major source of professional connection.
3. Lack of time is the most frequently cited major source of professional isolation.
4. There are more teachers with productive relationships in Other parts of New York State than one might have expected.

TRANSFORMATIONS:
Data reduction.
Tables ordered by frequency of response.
Summaries showing range of open-ended responses.
Weighted and unweighted estimates.
Exploratory data analysis (bar graphs and histograms).
Computational statistical tests to look for significant difference and similarities (One Sample T Test, and Chi-Square Test)
Create category system to make sense of qualititative data (esp. Five Commonplaces of Education).

RECORDS OF EVENTS:
Surveys.

EVENT:
Teachers' descriptions of how they experience professional isolation and connection.

Discussion of the Vee Diagram

This Vee Diagram was constructed at the end of the study. The principle changes include highlighting the Principles of Meaningful Learning discussed in the Conclusion chapter, a listing of the transformations actually used, highlighting knowledge claims which result from the analysis of the data, and a listing of value claims which are based upon those knowledge claims.

Appendix E: Principles of Meaningful Learning

THEORY AND PRINCIPLES OF EDUCATION

Joseph D. Novak

Theory:

Meaningful learning underlies the constructive integration of thinking, feeling, and acting leading to human empowerment for commitment and responsibility.

Principles:

1. Education leads to a change in the meaning of experience.

2. Every educative event involves five elements: (1) the learner; (2) the teacher (or vicarious teacher); (3) subject matter; (4) context; and (5) evaluation.

3. Concepts are what we think with.

4. Concepts are perceived regularities in events or objects, or records of events or objects, designated by a label.

5. Concepts are linked together to form statements or propositions.

6. Humans think, feel, and act.

7. Thinking, feeling, and acting are integrated, for better or worse.

8. Meaningful learning (non-verbatim, non-arbitrary, substantive) is one end of a continuum with rote learning (verbatim, arbitrary, non-substantive).

9. Meaningful learning requires: (1) a disposition (set) to learning meaningfully; (2) meaningful learning materials; and (3) some relevant knowledge.

10. Humans construct new concepts and propositions through meaningful learning.

11. Positive feelings, attitudes, and values are rooted in meaningful learning.

Principles of human learning include: (12-21)

12. Concepts are acquired early in life.

13. Concept meanings derive from the matrix of concepts and propositions in which they are embedded.

14. Misconceptions are acquired early and are resistant to change.

15. Prior knowledge influences new learning.

16. Context has a strong influence on learning and transfer of learning.

17. Information processing capacity is limited.

18. Knowledge is stored hierarchically.

19. Learners do not understand their cognitive learning processes.

20. Epistemological commitments of students influence their learning.

21. High levels of meaningful learning require high commitment.

22. Concept maps can be valid representations of an individual's concept/propositional knowledge structure.

23. Clinical interviews can reliably probe specific knowledge structures of individuals.

24. The Vee heuristic can be helpful to understand knowledge and knowledge production.

25. Event-centered, constructivist epistemology places emphasis on linking theory, principles, and concepts to records, record transformations, and knowledge and value claims through questions regarding the event(s) under consideration.

26. Understanding the concept/propositional nature of knowledge and knowledge production can facilitate learning.

27. Instruction should be planned through careful analysis (including concept mapping and/or Vee diagramming) of relevant knowledge.

28. Psychological organization of instruction takes into account both the learner's relevant knowledge and the structure of new knowledge to be learned, thus facilitating meaningful learning.

29. Rote learning may be encouraged when psychological organization is lacking in instructional programs and/or evaluation stress verbatim recall.

30. Mastery-mode learning using criterion-referenced evaluation is generally more desirable than conventional competitive instruction using norm-referenced evaluation.

31. Cooperative learning strategies are effective.

32. Metacognitive learning tools can substantially improve education.

33. Education theory and methods can improve the effectiveness of corporations.

34. Childhood experiences confer a greater or lesser degree of "I'm OK" feelings to people, and positive measures for ego enhancement are needed.

35. Normal individuals will manifest "Adult," "Parent," or "Child" ego postures, but "Adult" will predominate.

36. Psychologically sound instruction facilitates ego enhancement and Adult ego manifestation (one answer to classroom motivation/behavior problems).

37. Much evaluation in education fails to produce valid and/or reliable records of cognitive, affective or psychomotor achievements.

38. Multiple-choice and similar evaluation measures do not account for a high percentage of aptitudes and achievement.

39. Careful attention to valid learning principles and epistemology can lead to improved evaluation practices.

40. Concept maps and Vee diagrams can be effective evaluation tools.

41. Research should be theory driven, not method driven.

42. When statistics are applied as data transformation procedures, careful epistemological assessment of the event(s) being studied is necessary.

43. Highly effective teachers work from strong theoretical foundations.

44. Fairness, respect, and honesty are cardinal principles in effective teaching.

45. Effective teaching is very demanding in time and personal energy.

46. Constructive Caring for others requires honesty, openness, and commitment to understand other's cognitive and affective concerns.

47. Survival of human life on earth is probably dependent upon radically improved educational practices.

Appendix F - Author Contact Information

To contact the author, please write to:

    Robert Abrams
    382 Central Park West #8K
    New York, NY 10025

or phone:

    212-866-8875

or email:

    robert@robertabrams.net

or point your web browser to:

    http://www.robertabrams.net

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