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ABSTRACT

This book highlights the use of research and other forms of knowledge for meaningful school reform by faculties engaged in the National Education Association's "Mastery in Learning Project" (MIL). This project is a school-based education reform initiative designed to help school faculties take an active role in directing school renewal efforts, and in the process, restructure their schools to ensure that students achieve "mastery." The focus of the book is the utilization and creation of the knowledge base by project faculties. The first chapter frames some fundamental and complex issues involved in considering research use by teachers. It examines the phrase "teachers using research" and describes differing and potentially conflicting conceptions of each word of the phrase. Chapters 2 through 5 provide case descriptions of the use and/or creation of knowledge at four particular sites where faculties are working to improve grouping, mathematics instruction, professional development, and faculty collegiality. Chapters 6 and 7 investigate research and knowledge use across MIL sites. Reflections from outside MIL are featured in the final two chapters. These provide the reactions of a researcher and a teacher-scholar. (JD)

Teachers and Research in Action

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NEA SCHOOL RESTRUCTURING SERIES

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—Carol Livingston
Shari Castle

INTRODUCTION: PRACTICING THEORY—THE KNOWLEDGE BASE AND SCHOOL REFORM

This book is about teachers using the knowledge base to reform schools. Considerable knowledge exists that can help teachers and other practitioners bring about significant changes in their schools. However, in large measure, this knowledge has not found its way into the current efforts to improve schools, thereby greatly diminishing the impact of these efforts. If faculties engaged more fully in using the knowledge base underlying teaching, learning, and curriculum, the reform movement could have a more positive impact on students, teachers, and schooling.

Not only should teachers be involved in using research, they should be involved in creating original research. Without active practitioner involvement in the *creation* of knowledge, the body of information is less germane to the persistent problems of schooling. If the knowledge base is to be used, expanded, and enriched, there must be dynamic interaction between teachers and researchers. The chasm now existing between them must disappear

This volume highlights the use of research and other forms of knowledge for meaningful school reform by faculties engaged in NEA's Mastery In Learning Project (MIL). Thus, it is important to understand the nature of this national effort, its contribution to the national reform agenda, and its relationship to the schools represented in this book. This introduction, then, will describe the Mastery In Learning Project, examine some of the issues encountered in its linkage of research and practice, and introduce the chapters to follow.

THE MASTERY IN LEARNING PROJECT

The Mastery In Learning Project is a school-based education reform initiative designed to help school faculties take an active role in directing school renewal efforts and, in the process, restructure their schools to ensure that students achieve "mastery."

The Project is founded on the belief that "mastery" in learning cannot be limited to a discrete listing of easily measurable skills. It must include the facility and confidence, judgment and strength, and command of knowledge and skills to understand relationships, solve problems, and contribute to the culture. "Mastery" in teaching means developing students' knowledge, thinking skills, and orientations so they will apply

skills and knowledge creatively, productively, and responsibly to the world around them.

Achieving "mastery" as it is envisioned in the Mastery In Learning Project requires a re-examination of those decisions that reflect the substance, form, and quality of education: decisions about what is to be taught and learned; materials and methods of instruction; criteria and methods of assessment; expectations and roles for all stakeholders in the education process; and the use of space, time, and resources.

Because each school and community is unique, the specific characteristics of school and program must be defined within the context in which they reside. The Project builds on the principle that every decision about learning and instruction that can be made by a local school faculty, should be made by that faculty (Bentzen 1974; Bentzen et al. 1968; Carnegie Task Force on Teaching as a Profession 1986; Goodlad 1984; Sarason 1971). Decisions so derived will be more effectively implemented because teachers, administrators, and other staff will be committed to those decisions and will be able to articulate the reasons underlying that commitment. Well-informed by research and practice, faculties themselves become reformers. MIL is committed to the concept of teacher as thinker and informed decision maker.

Project Phases

Although the local faculty (teachers and administrators) designs the specific reform agenda within an individual school, the MIL Project design specified the process by which restructuring occurs:

- *Phase One: PROFILING THE SCHOOL* (several weeks). A description of the school is created to serve as a benchmark for the Project's efforts. Structured interviews with teachers, students, parents, and administrators provide data to describe the school on the day the Project begins. This description includes the school's academic program, instructional styles, student attitudes and aptitudes, and other conditions influencing learning and teaching.
- *Phase Two: INVENTORYING THE FACULTY* (several days). Through a series of group and individual activities, the school faculty establishes initial priorities for improvement. The process reveals similarities and differences in priorities and aspirations among faculty members. It begins the process of building the collegiality necessary for a comprehensive, faculty-led renewal effort.
- *Phase Three: EMPOWERING THE FACULTY TOWARD RENEWAL* (two to three years). The faculty works to create the skills, attitudes, and inclinations necessary for sustained inquiry into the assumptions and practices that define their school. They organize

working committees and coordinate their efforts through a Steering Committee. Using the knowledge base—research, theory, ideas and materials from good practice—the school staff explores improvement options and then designs, pilots, and revises specific programs or interventions. Project schools use TRaK (Teaching Resources and Knowledge—the Project's database), a specially designed computer network, and other sources to find the resources they need.

- *Phase Four: CULTIVATING COMPREHENSIVE CHANGE* (ongoing). Having developed a clearer sense of the nature of learning, teaching, curriculum, and school culture that corresponds to their vision; and having developed skills and habits of collaboration and collegiality; the faculty moves from fragmented activities to comprehensive change. They transform the school into a self-renewing center of sustained inquiry—the MIL concept of a restructured school.

The Role of the Knowledge Base

The emphasis on faculty interaction with the knowledge base distinguishes the Mastery In Learning Project from other "second wave" reform initiatives characterized by site-based, participatory, flexible, and personalized decision making (Michaels 1988). The following excerpt from the MIL Information Packet outlines the key issues involved in using the knowledge base as they were conceived at the onset of the Project:

> To make the best possible decisions for school renewal, faculties must have access to current, validated knowledge and information, ideas from good practice, and suggestions from the reform literature. There is, however, more information than any one teacher can read, assimilate, or use. The problem is
>
> - to organize the information for teachers to use in an effective and timely fashion;
> - to collect, sort, select, disseminate and, MOST importantly, help teachers use the research to improve educational opportunities for students, and finally,
> - to facilitate teachers' sharing their resources, experiences, and judgments to make maximum use of this information.

It is during the third phase, *Empowering the Faculty Toward Renewal*, that use of the knowledge base is central. At this point, the faculty must make informed decisions about how to proceed with their identified improvement priorities. Having completed the third year of the Project, many of the 26 schools in the Mastery In Learning network are still negotiating their way through the third phase. It is complex, but crucial.

Much of the Project's energy is devoted to providing faculties with the necessary time, skills, and resources required to explore options and make well-informed decisions. Each school has a special budget, a bank of substitute days to draw upon for released time, the services of a site-based consultant, an ongoing site-based documentation and assessment procedure, knowledge-base resources and assistance from the Project's central office, support from regional educational laboratories and universities, and, a resource of increasing importance, the faculty's own collective experience and knowledge. (For more information about the Mastery In Learning Project see McClure 1988, and National Education Association 1988, 1989.)

MIL Resource Assistance

The role of the MIL central office in resource assistance falls largely into two categories: 1) the creation and dissemination of topical packets, and 2) continuing response to requests for more specific information.

TRaK Packets

Initially, as faculties identified priorities, several topics emerged across sites as important to faculties engaged in site-based, faculty-led school renewal. These topics included critical thinking, integrated curriculum, discipline, learning styles and teaching models, faculty communication, parental involvement, writing across the curriculum, effective schools, empowerment, community involvement, class size, computers in education, cooperative learning, homework, language development, scheduling, self-directed learning, self-esteem, standardized achievement testing and its alternatives, student grouping, teacher planning, and others.

Specialists at the MIL office provided resources for initial exploration of the topics and consideration of options for action. They assembled a TRaK packet for each of these identified topics. Each packet provided a sampling of research articles, syntheses, articles from practitioner journals, bibliographies, and other materials. The intent of each packet was to represent dominant perspectives from the arenas of research, theory, and practice in forms applicable to all organizational levels. (Needless to say, this was an optimistic undertaking.)

Specific Information Requests

The second and ongoing category of assistance is response to follow-up requests for specific information after local faculties study the packet information and delineate more clearly site-specific needs. This assistance occurs in the form of printed resources as well as networking to individ-

uals and organizations. Augmenting the networking among project schools, regional educational laboratories, and other selected sites is a partnership formed with the IBM Corporation for the creation of a computer network devoted to school renewal (Castle 1988b, Futrell 1988).

What We Have Learned

Because collegial use, discussion, and creation of knowledge-base information have not traditionally been prominent activities among school faculties, we were interested in learning about these activities as they proceeded. Our inquiries included systematic data collection, informal discussions with participants, and reflections on our MIL experiences.

It became clearly evident that knowledge base use is a complex endeavor. The process evolved differently across schools and with varying degrees of success. We were able to draw some conclusions about the obstacles to and facilitators of teacher use of the knowledge base (Castle 1988a). We also became aware of some more fundamental issues of conceptual and epistemological origins that have influenced our attempts to understand and facilitate the linking of theory and practice.

THE CONTRIBUTION AND ORGANIZATION OF THIS BOOK

The focus of this volume is the utilization and creation of the knowledge base by Project faculties. The reader will encounter several expressions of the ways teachers and others use and contribute to the knowledge base for the purpose of school renewal. This work can be described as "practicing theory" - the title of the 1989 American Educational Research Association Invited Symposium from which the material in this book was derived. Particular attention is given to the usefulness of the knowledge base, the barriers encountered in its use, the spin-offs that occurred because of its use, and the differences in conceptual understanding that affected its use.

Chapter 1 frames some fundamental and complex issues involved in considering research use by teachers. It examines the phrase "teachers using research" and describes differing and potentially conflicting conceptions of each word in the phrase. Chapters 2 through 5 provide case descriptions of the use and/or creation of knowledge at four particular sites where faculties are working to improve grouping, mathematics instruction, professional development, and faculty collegiality, respectively. Chapters 6 and 7 investigate research and knowledge use across MIL sites. Chapter 6 considers the various sources of information MIL faculties have used to make improvement decisions, while Chapter 7 reports the messages MIL teachers have for the research community. The final chapters

provide reflections from outside MIL. Chapter 8 provides the reactions of a researcher, and Chapter 9 features those of a teacher-scholar.

The teachers and other contributors to this volume are striking out in new territories. Yet, a high degree of personal and professional security with the material under discussion, and a give-and-take between practitioners and researchers is evident. These bode well for future cooperation in the name of improved schools. The explorations of these professionals enormously enrich the reform movement.

—Robert M. McClure, Director
NEA Mastery In Learning Project

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1. TEACHERS USING RESEARCH: WHAT DOES IT MEAN?

by Carol Livingston and Shari Castle

Each word in the phrase teachers using research is interpreted differently by different people. Various conceptions of each word are described and resulting issues are highlighted. What does research mean? What counts as knowledge and who owns it? Does use mean application, justification, deliberation, transformation, or production? Are teachers classroom technicians, classroom artists, or professional decision-makers? The different and often conflicting conceptions of these terms add to the complexity of the relationship between research and practice. Developing a shared language is important for knowledge utilization and deliberation in site-based school reform.

Teachers using the knowledge base and *teachers using research* are essential notions in the Mastery In Learning Project. These phrases are deceptively simple. Indeed, after studying the obstacles to and facilitators of knowledge and research use among Mastery In Learning faculties, we wrote, "The assumptions [of using the knowledge base] were not problematic, the process of how to study and apply the information was problematic" (Castle 1988a, p. 6). After all, these faculties had applied and voted to become part of a national demonstration project with a strong commitment to knowledge-based decision making. Furthermore, they had requested information about their identified priorities. But what does *using research* or *using the knowledge base* mean to those involved? Closer examination of those key phrases reveals important issues germane not only to our Project, but to all efforts to link research and practice.

Each element of the phrase—*knowledge/research*, *use*, *teacher*—may be conceptualized in different and sometimes conflicting ways by those involved in the research-practice interplay. These conceptions, in turn, influence thought and action. We will illustrate the conceptual variation by discussing each of these elements with references to comments by MIL teachers[1] (their quotes blocked and in italics), by researchers, and by others writing about the relationship between research and practice.

WHAT IS THE KNOWLEDGE BASE?

The term *knowledge base* identifies an enormous umbrella under which different people place, or expect to find, various types of information. The term is used in discussions of teacher education and teacher competency to refer to "the entire repertoire of skills, information, attitudes, etc., that teachers need to carry out their classroom responsibilities" (Valli and Tom 1988, p. 5). A number of major research endeavors are currently underway to conceptualize and delineate specific knowledge bases. Another way to conceptualize the term, and the manner in which we have used it in MIL literature, is to regard the knowledge base of teaching as the full range of knowledge resources available to the profession. These include theoretical, philosophical, empirical, and practical resources.

We have encountered three issues while working toward the Project's goal of using the knowledge base. 1) How do people conceive of the terms *knowledge* and *research*, 2) what counts as knowledge and what is its source; and 3) which research knowledge should practitioners use?

Conceptions of the Terms 'Knowledge Base" and "Research"

The term *research* is used in several ways. Broadly, it is used as a synonym for the knowledge base. More narrowly, it is used to refer to the body of empirically-derived knowledge about teaching, learning, and schools. The terms *research* and *knowledge base* are often used interchangeably in our MIL literature. In our attempts to understand teacher use of the knowledge base in MIL, we have been hampered by different conceptions of the meaning of the term *research*. For example, data from project documentation interviews revealed that over one-fourth of the faculty members queried responded negatively to the question, "Has your participation in the Project made you feel more comfortable using educational research to enhance your skill as a teacher?" We realized that, to some respondents, search meant quantitative empirical studies. For others, particularly during the Project's first year, the term research seemed to evoke images of the infamous blue TRaK packets (Using research had come to mean reading, in its entirety, a thick generic packet of miscellaneous literature.) Our medium had become our message. A typical comment:

> *The research [packet] turned over to our committee was not appropriate. We were overwhelmed by it*

We considered, first, that the question itself might be biasing the responses. Since the deficit assumption in the wording of the question troubled some respondents, we rephrased the question. Secondly, we felt

that the term *research* might be too restrictive. We tested this hypothesis for a sample of respondents during the spring 1988 cycle of documentation, by asking the rephrased question twice, once using the term *research* and then using the phrase *research and outside resources and perspectives*. In each case the responses revealed that the respondent interpreted our question more narrowly than we intended. For example, a teacher who answered an unequivocal "no" to *research* use responded to the second question:

> *Oh definitely! I like very much the idea of teachers having released time [to learn]*

She explained that, throughout her career until this year, she has needed to take off several days for "R & R," she has become "recharged" since becoming involved in a research program with a major university and having the opportunity to investigate the effects of new approaches to teaching and learning. Clearly, the documentation questions were not fully disclosing teacher involvement with the knowledge base.

As we discussed these findings and contemplated ways to increase the role of knowledge-based deliberation in school restructuring, we discovered that even within our informal conversations in the Project office, there existed a range of perspectives about what it might mean to *consider the options*, which resources to disseminate, and in what form to disseminate them. As we examined our own assumptions and conceptions, we wondered about those of the teachers, administrators, project consultants, and others in MIL and how those differing assumptions and conceptions might influence MIL's efforts to link research and practice.

What Counts as Knowledge and Who Owns It?

Educational research does not converge into a unified view of problems, methods, or roles for researchers and practitioners. It has developed from a variety of parent disciplines and responded to diverse interests and concerns in various social, political, and cultural contexts. Each approach holds a different perspective on the relationship between theory and practice. Carr and Kemmis (1986), for example, identify three general positions vis-a-vis educational research: positivist, interpretive, and critical. Table 1 contrasts each paradigm in terms of aim, epistemology, role of researcher, and view of rationality. It is not the intent of this chapter to explore these contrasting approaches in depth, but rather to point out that these perspectives influence the research-practice relationship at many junctures including the way research is written or "packaged," the manner in which it is shared or disseminated, the way it is interpreted, and the certainty with which it is received.

Table 1
CONTRASTING PARADIGMS IN EDUCATIONAL RESEARCH
Condensed from Carr and Kemmis (1986)

	POSITIVIST EDUCATIONAL RESEARCH	INTERPRETIVE EDUCATIONAL RESEARCH	CRITICAL EDUCATIONAL RESEARCH
AIM	explanation direction	understanding	transformation
EPISTEMOLOGY	prediction based on scientific laws	practical judgment based on understandings of practitioners	both controlled intervention and practical judgment as part of the self-reflective spiral
	(basis for informing future action)	(basis for explaining past action and understanding the future)	(basis for understanding the world and changing it)
ROLE OF RESEARCHER	disinterested observer	empathetic observer	participant as researcher; research as deliberately social process
VIEW OF RATIONALITY	"objectivist"	"subjectivist"	"dialectical"

It is important to remember, however, that in the dominant traditional model of the research-practice relationship, education is an applied science. In essence, this perspective separates researchers from practitioners, positing the research community as the source of knowledge to be applied by personnel in schools. The knowledge of practice is, at best, something to be validated with empirical findings. The model describes a linear and unidirectional pattern of educational improvement: research, development, dissemination, implementation, and evaluation "[Schools] are looked upon as *objects* to be changed, not as *centers of change*" (Sirotnik and Clark 1988, p. 661).

Which Research Knowledge?

Educational researchers inquire within a particular paradigm and hold membership in a community of peers who share specific theoretical, empirical and methodological tenets. Furthermore, researchers in that community may question (if not reject outright) the theoretical, empirical, and methodological tenets of those in other educational research communities. The journal, *Educational Researcher*, has hosted an ongoing dialogue about these paradigmatic issues.

In the integrative world of practice, these research "camps" may pose problems. Do practitioners select a paradigm and reject others? Do they attempt to wend their way through research representing different and conflicting world views? Secondary teachers, in particular, may be comfortable with dominant approaches to research within their content disciplines. However, MIL requires that faculties work collaboratively across disciplines. What counts as "good" research when physics teachers work with history teachers to improve their school? One of the suggestions to reduce the quantity of information in our TRaK packets was that we select "the cream," or information from "the leading authority." But who decides and on what grounds? Practitioners confront these issues, however implicitly, whenever they select, integrate, and use research.

CONCEPTIONS OF USE

Research can be "used" in qualitatively different ways. Logically then, there are differing conceptions about what it means to "use the knowledge base" in decision making. To a degree, these conceptions parallel paradigmatic variations. Five conceptions will be discussed: 1) application, 2) justification, 3) contemplation/deliberation, 4) transformation; and 5) production. They are neither exhaustive, nor mutually exclusive, but represent dominant operational conceptions of research use within the Project.

Application

Recent leaders in the federal education enterprise have clearly favored research use as application of findings. Chester Finn (1988) called for the redefinition of the constituency of education research to potential "consumers." He urged researchers to produce more immediately and practically applicable findings—i.e., "what works." In this conception, the function of research knowledge is to direct practice. The application conception promotes the perspective that research will have "the answer." Although the body of empirical studies on education is growing in vol-

ume and quality, it cannot provide definitive answers for all questions in all contexts. Those who turn to research with this expectation are frequently disappointed or disillusioned.

Another major problem with this conception is that "applying" findings can leave practitioners feeling schizophrenic. Research findings may conflict with one another, and it is highly risky to apply results without consideration of context. Teachers must accommodate conflicting expectations of parents, students, curricula, materials, state regulations, their own philosophies, and more. Small wonder that they may resist yet another set of conflicting expectations to integrate.

> *I've heard of research to the kazoo! Everything is 'research says, research says.' You can get sort of dead with research*

Furthermore, the "application" approach has too often appealed to persons in powerful organizational positions who favor the synthesis of research findings into finite lists of cardinal principles. When research is translated into recipes for practice, the caveats and cautions of the researchers go unheeded. Unintended results of such "application" include rigidity in practice, the demeaning of teacher and administrator judgment, and reinforcement of research-rejection by practitioners.

> *[Research has not helped me enhance my skill as a teacher] because I've had to "dig" all of my professional career of 28 years to find out for myself why students fail and what I can do as a teacher to prevent failure, how these students can learn and how these students will learn. No student wants to fail Our present educational modes and techniques force failure*

We are not arguing that the application of research-proven techniques is always inappropriate. Thoughtfully considered application of research knowledge holds power for school improvement and personal efficacy. But that mode of application suggests a different conception of use.

Justification

The partner to application is justification Traditionally, the language of research utilization has been one of justification and control. For years, teachers have been "inserviced" in "research-proven" techniques; their curricular mandates are "research-validated," and their evaluation checklists have been "research-derived." As teachers become involved with research themselves, the mystique of research may be lessened. Sometimes demystification results in blatant cynicism.

We studied a lot of research with my group.... You can prove any point you want with research. I don't view things the way I used to I've come to view that research doesn't prove anything

Validation provided by research is ill-used when the importance of a particular position is used to inhibit questioning and inquiry or when a faction uses the research knowledge selectively to preserve power or status (Lanier 1984). Teachers, themselves, are not immune to such abuses. For example, an MIL Steering Committee made unilateral decisions, justifying them with selected research findings. A colleague complained:

Sometimes the things they've done research on may not be the best out there.... There are so many other resources and ideas that are not being consulted.

Validation from research, however, can empower individual teachers by reinforcing practical wisdom and providing teachers with the courage, based on well-informed reasoning, to challenge the regularities.

Now I feel like no one is going to assume my class is out of control when children are out of their seats, lying on the floor, not in straight rows Research has demonstrated that children learn better in an orderly, but relaxed environment

Validation from research can also empower a faculty to extend their discussions beyond their classrooms. This process can increase the norms of collegiality (Little 1982) and enable the presentation of well-founded, well-reasoned decisions to colleagues, administrators, parents, and community. In MIL, for example, teachers have gone to district administrators and obtained waivers from district regulations because of their well-founded, well-articulated reasons for wanting to try a new program.

Another reward is that teachers know, have the feeling they really know what they're talking about. Because they have read the research, they have studied all this. There are always political difficulties ... but if you come in with a solid ground, you feel a lot better about it I do think it is important for people to really study what they are dealing with and know what they are talking about

Such validation is a critical component in MIL's notion of "faculty empowerment."

Contemplation and Deliberation

This conception of research use implies that teachers deliberate among contrasting versions of good teaching or schooling. Through the process of deliberation, they expand their repertoires of practical knowledge.

They use research to inform rather than to direct practice. "Bringing the fruits of research into practice seems to require [that]. . . intelligent practitioners, through deliberation, make the important connections and adaptations themselves" (Clark 1986, p. 22).

Buchmann (1984) reminds us that, because research does not and cannot offer guarantees, we must exercise "second thoughts." To practitioners she asserts, "Trust and doubt are the two faces of knowledge use. The hesitation to trust is realized in observation, reflection, experimentation, and revision—second thoughts that, on the whole, tend to be better than first ones" (Buchmann 1984, p. 431). The MIL language of *considering the options* and *examining practice* suggests moving beyond application and justification to a contemplative and deliberative stance toward research use.

> *Exposure to research and ideas . lights a tail under people . . . but they need to work on [critical deliberation] rather than merely looking and selecting.*

This manner of use requires a spirit of collegial self-critique and examination—qualities MIL schools are striving to to exemplify, but which are not commonplace in most schools. As an example, a documenter from an affluent and traditionally "effective" MIL school discussed the dilemmas encountered in encouraging faculty to examine their practices and consider options. Teachers felt that to engage in such activities was to declare that something was wrong and in need of problem solving. Several of the respondents cited the adage, "If it's not broke, why fix it?"

Sirotnik and Clark (1988) identify this mode of thinking as a residue of the traditional view of educational change and improvement: "Educators in the schools are seen not as professionals who can reflect on ways in which they might best do their work, but as workers deficient in one or more skills and in need of training. Schools are viewed as places in need of repair rather than as imperfect institutions that are continually growing and changing" (p. 661).

Transformation

Closely related to the use of research knowledge for contemplation and deliberation is its role in stimulating the mind to view reality in new ways; that is, to frame situations or problems differently and to interpret reality through new metaphors (e.g., Schon 1983, 1987). We are reminded that *every way of seeing is a way of not seeing*. In this conception of use, formal knowledge enables the knower to appreciate and transform action situations.

Even though we have zeroed in on math, we have also had a spillover into other things. And I think we think about, 'Is that developmentally appropriate?' You learn new ways of looking at things

A number of MIL schools identified priorities at the outset of the Project, and in the process of investigating the identified topics, changed their perceptions of the "problem." The following quote about the purposes of student grouping illustrates one such transformation.

The farther into grouping we got, the more we realized that it was not so much an instructional problem as an equity problem.

Several MIL faculties are examining the assumptions behind tracking and are transforming their conceptions of optimal ways to foster student achievement. In a critical inquiry mode, this approach encourages practitioners to reflect on their practices and to attempt to identify and critically examine the assumptions underlying them (e.g., Carr and Kemmis 1986).

Increasingly, faculties are coming to recognize the power of research as a focal point for inspiration and vision as well as information and support, both individually and collectively.

Yes, the ideas and questions raised in the educational research have been thought-provoking . It has broadened our visions and given us hope for change in the future.

Production

The fifth *use* of research, and probably the one that offers the most optimism for the interdependence of research and practice, is the active involvement of practitioners in the research process. Robert McClure, MIL Project Director, recently remarked:

> At the outset of the Mastery In Learning Project I would have said that using research means getting ahold of something that might be called a summary and thinking about your own problems and thinking about what that piece of paper told you--and adapting it Now I think that the--I *know* that the line between creating knowledge and using someone else's creation is almost non-existent And that to use research, one is also a researcher.

The notion that research and practice are separate spheres of activity is being challenged by a growing number of practitioners who *are* researchers themselves, and who report that, in the process, they develop profes-

sionally, improve their craft, and add to the knowledge base of their profession. Lawrence Stenhouse, a leader in the movement to engage teachers as partners in the research enterprise, defined research as "systematic and sustained enquiry, planned and self-critical, which is subjected to public criticism and to empirical tests where these are appropriate" (Stenhouse 1985). Teacher research, thus, can vary widely in formality and scope. Examples of approaches include: interactive R & D (e.g., Jacullo-Noto 1986); university-teacher collaboation (e.g., Porter 1987); teacher-as-researcher support groups (e.g., Mohr and MacLean 1987), classroom research (Hopkins 1985); and action research (e.g., Carr and Kemmis 1986).

The following statement refers to a faculty initiative in which committee members read current research and designed a survey to investigate science instruction in their school:

> *It's absolutely going to improve instruction because right now they're not teaching any physical science at all . Unknowingly. Everyone assumes someone else is doing it So it's going to improve instruction by allowing the children to have a better base in three science areas at every level. (MIL site consultant)*

MIL faculties have been designing and implementing research activities since their first year in the Project; Schaefer describes one of those investigations in her chapter. Increasing interest in doing research has resulted in the compilation of an MIL resource packet entitled, *Teachers As Researchers*.

CONCEPTIONS OF TEACHER

Certainly, one's own conception of self as teacher and the conception that others hold of the teacher, explicitly and implicitly, exert profound influence upon the relationship of research to practice. Three broad conceptions will be highlighted: 1) classroom technician, 2) classroom artist, and 3) professional decision maker.

Classroom Technician

Requests for "immediately useful," "take-and-go practical," "the leading authority in the area," "non-conflicting," "predigested and summarized"[2] information raised important questions about the conception many teachers have of themselves and their role. There is much in the life of today's teacher that suggests a largely technical function. Increasingly bureaucratized decision making structures have robbed teachers of fundamental decisions about teaching, learning, and curriculum

(Lieberman 1988; Livingston, Castle, and Nations 1989). Current school practices provide little time for teachers to read and engage in discussion. Furthermore, application of several decades of effective schools research has encouraged technical teaching by its emphasis on discrete, measurable behaviors (e.g., Glickman 1987). Despite these constraints, teachers must view themselves and be viewed as more than technicians, or the worlds of research and practice will remain separated.

Classroom Artist

Teachers are quick to point out that there is much about excellence in teaching that defies "scientific" analysis. "Theory and generalization from educational research can provide a guide—but never a substitute for—the teacher's ability to read the meanings that are found in the qualities of classroom life" (Eisner 1984, p. 452). Eisner speaks for a growing number of educators who contend that we must move away from the image of education as an applied field. He makes an eloquent plea for alternate methods of inquiry that capture the artistry of teaching. Indeed, naturalistic reports are capturing the more artistic qualities of teaching and learning so often stripped from more conventional theory-testing research. Such pieces of research as *The Good High School* by Sarah Lawrence Lightfoot (1983) contribute to visions of schooling for professionals and public alike. Greater acceptance and availability of naturalistic research may help to exemplify visions of artistry.

Others argue that artistry in teaching is an element of excellence, but not in isolation:

> There are many effective style variations among teachers, characterized as the *intangible art of teaching.* But art alone does not make a teacher. Complementing this must be a specialized set of skills grounded in a professional knowledge base. Together they comprise the science of teaching. It is the combination of art and science that makes a professional teacher (Billups and Rauth 1987, p. 626).

Professional Decision Maker

Although teaching is spoken of as a profession, professional status often eludes teachers. The public, administrators, and even teachers themselves fail to view or treat teachers as professionals. The issue of professionalism is a critical ingredient in school reform. So what does it mean to be professional?

Case, Lanier, and Miskel (1986) identify accidental and essential characteristics of professionals. Accidental characteristics include testing, certification, and salary. Essential characteristics include possession of a spe-

cialized knowledge base, a commitment to inquiry, service to the public good, and collegial relationships with peers. A major goal of school reform is to replace the occupation of teaching, characterized by skilled craftspersons working in isolation, with true professionalism.

I do think there are lots of teachers . . . who just have an opinion about something, and that's all That's the way it is. That's the way that somebody had told me to do it, and we don't want to discuss it any further And I think part of being a professional is you're constantly trying to get real information to have a better data base for making decisions.

The professional does not merely apply knowledge nor does she/he teach by artistry alone, but integrates various bodies of information and knowledge to design applications that meet unique and changing circumstances. The professional's behavior "is characterized by a drive to know *why* things are as they are and driven by a passion to know more in order to improve existing conditions" (Case, Lanier, and Miskel 1986, p. 42). The professional realizes that the extended responsibility of collaborating around school-wide issues is part of the teaching role, not an addition to it.

I feel more in touch with the world of education outside [my community] It isn't that we didn't have the opportunity to look at ourselves before We just took a deeper look . The most important thing is it made a professional connection for the whole staff. I think the staff is feeling and ing more professional.

The ideal Mastery In Learning teacher is a responsible, informed, professional, and collegial decision maker—able and willing to critically examine school and classroom practice, seek and consider knowledge-based options, and thoughtfully weigh them against factors of context, goals, and values—the teacher who is striving for wisdom in practical decisions (Buchmann 1984; Fenstermacher 1987).

Personally, I feel that [using the knowledge base] has lessened the gap found between administration and staff that is found in most schools I think the staff is more tolerant of each other—having more insight into each other's problems Student-wise, it has made our goals more clear and given us definite objectives to work collectively for

CONCLUSIONS

In sum, conflicting conceptualizations of each word in the phrase *teachers using research* influence the interplay between research and practice First, educators have different conceptions of what the terms

knowledge and *research* mean and what each legitimately includes. Relationships between theory and practice are paradigm-specific. Conflicting paradigms increase the difficulty of integrating new knowledge into daily practice. Second, different conceptualizations exist about what it means to *use* research: application, justification, contemplation and deliberation, transformation, and production. Third, conceptualizations of teacher as technician, artist, or professional decision maker affect the kind of research that is conducted and the way it is used. Such assumptive diversity leads to difficulties in the research-practice dialogue.

At the same time, the current educational arena is quite stimulating: The knowledge base on teaching and learning is expanding; alternate paradigms of inquiry are appearing within the mainstream and are challenging assumptions of *knowing*; the second wave of school reform is calling for more participation by practitioners on-site in school decision making; and reform reports recommend increased collaboration among stakeholders in the educational enterprise--teachers, researchers, administrators, parents, community, and business.

Sirotnik and Clark (1988) articulate the importance of the knowledge base to school-centered decision making and renewal. They write:

> We must reexamine the idea of schools as centers of decision making and renewal, or we will find that all our discussions of school-based management will simply propel us further along the path toward unsuccessful efforts at change and renewal. If we don't understand the significance of the school as center of change, we will continue to see it only as the target of change And we will fail to recognize and tap the reservoir of knowledge and talent that already exists there (Sirotnik and Clark 1988, p. 664)

We believe that research will have the greatest impact on practice in *centers of change*; that is, when research becomes a foundation for deliberation, when teachers themselves become inquirers, and when inquiry becomes a mindset—a primary mode of practice. Experience has demonstrated that successful change does not come when schools are targets for externally imposed mandates or when practitioners are passive recipients of externally-derived knowledge.

Through process and resources, MIL has lessened the barriers of practitioner access to the knowledge base. Indeed, through our partnership with IBM, a computerized information network links our Project schools with regional educational laboratories, several universities, and other school renewal sites across the nation. This network facilitates the sharing of information, research, practical knowledge.

Still, the relationship between research and practice is in flux. It is clear that not everyone involved in MIL shares the same operational con-

ceptions of teaching, knowledge, and research use. The inevitable result is that the shared terms we use are not, in fact, shared language, within schools or across schools. Without shared language, we cannot communicate clearly researcher to practitioner, researcher to researcher, practitioner to practitioner. We are certain that this condition is not unique to MIL. By investigating the understandings and attitudes toward research of faculty members in the 26 demographically diverse schools of the Project and their evolving patterns of faculty deliberation and decision making, we can better understand the issues embedded in bringing the knowledge base into the practice of site-based school renewal.

DISCUSSION QUESTIONS

1. What are the various conceptions of *research*, of *use*, of *teacher*? Are there others not described in this chapter?
2. What conflicts result from these different conceptions?
3. What are the implications for linking research and practice?
4. What are your primary conceptions of each word? How does this affect your work?

FOOTNOTES

[1]Quotes come from interviews with two faculties concerning research use in curriculum development (Castle, Livingston, and McClure, 1988), and Project documentation interviews. Two of the documentation interview questions in particular queried teachers' comfort using educational research, and the degree to which the use and development of research had produced results within their schools. The quotes selected for this chapter represent patterns observed across multiple school sites. The differences in perspectives were presented within faculties as well as across faculties, no school presented homogeneous views with regard to the value and use of research.

[2]These phrases are taken from faculty responses to the MIL survey regarding teacher use of the knowledge base (see Castle, 1988a).

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2. USING RESEARCH TO SOLVE STUDENT GROUPING PROBLEMS

by Jimmy E. Nations

A primary school identified grouping as an improvement priority. The Grouping Committee conducted a two-year review of the school's practices. Members read research, found frameworks to assist in organizing conflicting findings and issues, and discussed the problem at length. They recommended heterogeneous grouping and used research to convince their colleagues that the changes were best for students. Eventually approved by the faculty, the changes had a positive impact on the school. As a result of this experience, the teachers gained confidence in the process and results of making research-based recommendations.

Three potentially fruitful hypotheses emerge from an analysis of the work of the Grouping Committee at Westwood School:

- teachers are unaccustomed to using educational research as a source of data for making decisions about problems and issues that affect their daily lives;
- teachers find the results of individual, isolated studies confusing and unproductive, but they welcome research findings presented within a comprehensive framework as substantive input to the decision making process;
- teachers who learn to use research as one source of data for decision making have greater confidence in both the process and the products of their deliberations about persistent educational problems and issues.

Westwood is a primary school located in an affluent town in northwest Georgia, the center of the carpet industry. The approximately 565 students in kindergarten, first-, and second-grade classes are predominantly middle-class, however, the socioeconomic range of the school extends from very low to very high.

The staff of Westwood School consists of 26 classroom teachers, four full-time specialists, four part-time specialists, 11 full-time paraprofessionals, 14 part-time paraprofessionals, a lead teacher, assistant principal, and principal. Ten of the professional staff hold bachelor's degrees, 10

educational specialist degrees, 17 master's degrees, and one doctoral degree.

Westwood, one of five schools involved in the pilot phase of the Mastery In Learning Project during the 1985-86 academic year, is now in its fourth year of involvement in the Project. The Westwood staff agreed unanimously to participate in the Mastery In Learning Project, even though the school was already perceived as being highly successful. Achievement test scores were very good, parental and community support were strong, and staff morale was high. Westwood School entered the Project with a clear sense of strength, but with the recognition that improvement is always possible.

Throughout the initial assessment phase, the staff expressed some concerns readily and clearly. For example, almost everyone agreed that student behavior in common areas (hallways, bathrooms, lunchroom) was a problem. Teachers also agreed on the need for more child-centered considerations in curriculum development. Staff committees formed to deal with these issues.

Other concerns were not as blatant, but were, nonetheless, persistent. That is, these concerns emerged in some form in every assessment activity, in all written responses, and in all groups interviewed. Concern for the way students were placed in classroom groups was one example. The Grouping Committee formed to address this concern.

The Grouping Committee at Westwood School consisted of eight classroom teachers and the lead teacher, all of whom had chosen to participate in the work of this committee, meeting for one-hour sessions each month over a two-year period. They completed frequent reading assignments between meetings.

The first two or three meetings of the Grouping Committee were rather rambling discussions, centered mainly around personal experiences related to various forms of grouping. Some discussions were about placing students in classroom groups, others about grouping within the classroom for instructional purposes, and still others about grouping across classroom lines. Frequently, the committee lacked clarity about the kind of grouping that was under consideration.

The committee's attempts to review the research in this phase of its activities added to the confusion. Members reported on individual studies gathered in a "catch as catch can" manner. The significance of individual studies was often lost, and the findings of different studies were sometimes clearly contradictory. The good intentions of committee members were unfocused and largely unproductive.

During this time the committee made an interesting but unsettling discovery. Westwood teachers did not know how classroom groups were formed within the school. This discovery was particularly startling be-

cause the staff perceived itself as open and communicative, characterized by cooperation and free give-and-take between teachers and administrators. The reality of the situation was that the principal and lead teacher had a clearly defined method of assigning students to classroom groups, with no intention of secrecy. Nevertheless, most teachers did not know what method that was. They simply accepted the students assigned to them without understanding the intended make-up of the group. The first definitive task of the Grouping Committee was to learn about classroom grouping practices in effect at Westwood School.

The methods used to assign students to classroom groups were relatively simple. Kindergarten classes were structured to be heterogeneous, with students assigned to classrooms on the basis of composite scores on a pre-school assessment instrument administered individually during the spring of the year before school entrance. Each class received a range of students that approximated the range of all the kindergarten students in the school.

First-grade classes were designed to have controlled heterogeneity. Each class contained top, middle, and lower groups of students, but not the complete range of the total population. Students were assigned to classes on the basis of achievement levels, study skills and social behavior, and kindergarten teachers' predictions for their success in first grade.

In second grade, students received two classroom assignments: a homeroom assignment and a language arts group assignment. The intent was to make homerooms as heterogeneous as possible, based on the judgment of first-grade teachers. Language arts assignments relied on level of student achievement in reading. The highest achieving students formed the top group, and so on down the line. These groups were homogeneous according to reading achievement. Students spent the major part of their school day in these groups.

At about the same time that members of the Grouping Committee learned of current practices in their own school, they received copies of Jeannie Oakes' *Keeping Track: How Schools Structure Inequality* (1985). After reading, discussing, and analyzing the book, committee members focused their attention on issues surrounding the perennial debate of homogeneous versus heterogeneous grouping. The fact that differences in classroom groupings existed in their own school became a concern. Kindergarten and first-grade classes were characterized by planned heterogeneity; second-grade language arts classes were characterized by planned homogeneity. Questions emerged as to whether or not these grouping differences might, in the long run, be counterproductive.

The work of any committee is never linear, clearly channeled, and focused. The Grouping Committee at Westwood School demonstrated this point well. If committees are lucky, however, they do find the tools to

organize their efforts and significantly further their work. The introduction of the framework that John Goodlad (1960) developed for reviewing the research on grouping proved to be a highly workable tool for the Grouping Committee. Goodlad categorized the total range of grouping questions along horizontal and vertical lines, and thus provided a framework for classifying issues related to grouping. This framework helped committee members to categorize more recent research studies, and to formulate a more substantive basis for discussing, analyzing, and evaluating the grouping practices in the school.

During the summer between the first and second years of the committee's work, the chairperson of the committee enrolled in a graduate course on educational research. She chose the topic of grouping for her research paper, synthesized a great deal of the committee's study to that point, and extended the committee's work. Her paper (Knight 1986) became another working document for the committee.

With a fairly comprehensive awareness and understanding of the research on grouping, and reinforced by numerous discussions with colleagues and peers, members of the Grouping Committee finally came to the difficult conclusion that the homogeneous grouping of second-grade students for the major part of their day was inappropriate and created a variety of problems for both students and teachers. The Grouping Committee further concluded that the methods for placing students in classroom groups in kindergarten and first grade were consistent with the school's philosophy, appropriate for the maximum development of young children, workable for instructional purposes, and readily accepted by the community.

At this point, yet another document was introduced for the committee's consideration. Warren Findley and Miriam Bryan's (1975) analysis of the pros and cons of ability grouping bolstered the committee's confidence in its conclusions and helped to move the group forward in making recommendations for change. (From this document the committee learned that the method for placing first-grade students in classroom groups at Westwood is called the "Baltimore Plan of stratified heterogeneous grouping by tens." Findley and Bryan actively support the plan as a viable alternative to ability grouping.)

The time had finally come for the Grouping Committee to formulate its recommendation, based on sound research and judgment. The specific recommendation was to group the second-grade classes in the same way that first-grade classes were already being grouped.

The committee did not reach its conclusions and recommendations hastily, nor did the committee report them to the total staff in haste. As a matter of fact, committee members practiced their skills of task avoidance for two or three meetings before they set a date for making their re-

port to the entire staff. Admitting that one might have been wrong in the past and that some fairly substantive changes need to be made in the way one operates is not easy. Telling one's colleagues that they might have been wrong and that they need to change is downright difficult.

The Grouping Committee finally faced its responsibility and made its report. They presented a summary of the research on grouping to the staff. The committee's conclusions and recommendations were stated—and politely accepted.

Anxiety and resistance did not appear until more specific plans for change took shape; and it is fair to say that, at that point, discussion ran rampant. Because the proposed changes affected second-grade teachers the most, it was decided that all of them must agree to the changes or no changes would be made The proposals were unsettling to these teachers, not only because methods of grouping would be revised, but because changes would be required in the ways they would teach on a day-to-day basis. A great deal of soul-searching and envisioning was required of them. They talked through all of their negative reactions and anxieties. Finally, one teacher said, "Let's face it. If we are thinking about the children, we know this is what we should do. We're just afraid to change." Her comment paved the way for full acceptance of the Grouping Committee's recommendations.

One cannot describe the changes made at Westwood School as a result of this one committee's work as innovative or startling, nor can one describe them as comprehensive. The committee did not address the entire range of questions about grouping: graded grouping versus nongraded grouping, self-contained classrooms versus team teaching, and so on. The changes did, however, have a positive impact on the entire school. Grouping practices are now more consistent throughout the school. Second-grade students and teachers like their new way of grouping. The competition fostered by the previous grouping for language arts has given way to cooperation. A greater sense of stability replaced the disruption caused by two class assignments, one for homeroom and one for language arts.

The work of the Grouping Committee at Westwood School demonstrates that these teachers were able to use research, within a comprehensive framework, as one source of data for decision making. No claim is made that the research made their decisions for them. The substantive support of the research base did, however, give them confidence in their conclusions and recommendations It also helped them to convince their colleagues and gain their support for making changes in the school.

Whether or not these findings apply to all teachers is a question for the researchers Some hypotheses for consideration appear at the outset of this chapter.

EPILOGUE

The chairperson of the Grouping Committee, a second-grade teacher, readily admits that she joined the committee because she liked the way students were grouped for language arts. Her determined intent was to preserve the status quo. However, after extensive study of the research literature on grouping, she became one of the strongest advocates for the changes proposed by the committee.

She is now working on a committee whose purpose is to design ways to promote self-esteem in students. More than once she has been heard to say, "We really can't do anything until we have reviewed the research, because without a research base we won't have a leg to stand on."

DISCUSSION QUESTIONS

1. What was the grouping problem/issue at Westwood School?
2. What processes were used to reach a decision on grouping changes within the Grouping Committee; within the total faculty?
3. What difficulties did the committee encounter; the total faculty? How were these overcome?
4. What difficulties have you encountered using research to solve a particular problem? What workable solutions were generated? What remained unsolved?

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3. BECOMING RESEARCHERS: TEACHING MATHEMATICS TO GRAY-AREA STUDENTS

by Patricia M. Schaefer

The faculty at an elementary school created a research class to increase their skill in using and conducting research. Because they were concerned about meeting the needs of gray-area students, they designed and conducted a quasi-experimental study comparing mastery learning in mathematics with traditional mathematics instruction. They planned to assess differences in achievement and attitudes toward mathematics. Enthusiasm for reading and conducting research was fostered. Confidence and credibility were increased.

The faculty at Aire Libre Elementary School in Phoenix, Arizona, determined that the needs of low-achieving, or *gray area*, students were not being met. As part of their involvement in the Mastery In Learning Project, they formed a committee to develop a plan for assisting these students. The Gray Area Committee struggled with the tasks of defining *gray-area* and determining specific areas of student need. They then sought to provide a program to meet those needs and, eventually, to determine the effectiveness of that program.

TEACHERS AND RESEARCH AT AIRE LIBRE

Because the Mastery In Learning Project encourages teachers to use research to make informed decisions, the Aire Libre staff participated in a research class designed and taught by the MIL project consultant. The class assisted teachers with interpreting research articles and becoming more confident about consulting research.

In order to make the research class relevant, the class focused on the Gray Area Committee's task of defining and implementing goals. The definition of gray-area students originally ranged from students who were obviously bright but did not qualify for the honors program to students who were achieving below grade level expectations but were not eligible for special education services. After much discussion and compromise, the committee agreed to limit the emphasis to students at the lower achievement level in the area of mathematics.

When the Mastery In Learning Project began at Aire Libre, all intermediate-grade students were grouped heterogeneously by grade level for homeroom and then regrouped homogeneously for reading and mathematics instruction. Teachers were generally satisfied with the effects of the existing grouping structures on student achievement.

As the Gray Area Committee began to read research about the teaching of mathematics and grouping for instruction, they encountered information that made some members question existing practices. However, other members were ready to "buck" the research. Further study of research in mathematics teaching revealed that the mastery method of instruction was an effective way to teach low-achieving students.

With the help of the research class, the Gray Area Committee decided to investigate the teaching of mathematics to low-achieving students using the mastery method, incorporating the use of manipulatives in heterogeneous groups. As plans progressed, committee members became excited about conducting an actual research project. Again, the research class assisted with the design of the research project and with data gathering and interpretation. The following section describes the research activity.

MASTERY TEACHING COMPARED WITH TRADITIONAL TEACHING IN MATHEMATICS

The research on grouping for instruction yields varied conclusions. Kulik and Kulik conducted a meta-analysis of grouping research and reported that "students gained somewhat more from grouped classes than they did from ungrouped ones" (Braces 1986). In contrast, Slavin's best evidence synthesis indicated that ability grouping does not increase student achievement, although grouping within mathematics classrooms has been effective Below-average students have not been found to benefit from homogeneous grouping. While such grouping has been popular, it has not been successful due in part to the lack of adjustment of instructional materials and methods. Teachers often underestimate the capacity for learning in lower-level students. Furthermore, the absence of higher-achieving students in the lower-achieving classes results in a lack of stimulation for the lower students (Good 1984; Esposito 1973).

The mastery method of instruction has been demonstrated to be effective, especially for low-achieving students (Good 1984; Burrows 1975). Components of Benjamin Bloom's mastery concept include cues, active learner participation, reinforcement, and feedback. Mastery learning procedures include teaching, testing, correcting, and retesting. Progress is monitored by mastery tests that give teachers an ongoing evaluation of student achievement and rate of learning (Good 1984, Grossman 1985).

Attention is focused on both cognitive and affective student characteristics.

The mastery approach has been shown to have positive effects on student attitudes toward learning, thus resulting in better attendance and higher student motivation (Sagor 1988; Grossman 1985). The method motivates, in part, because it makes tasks meaningful and matches student entry characteristics to selected learning tasks, thus overcoming poor student attitudes toward learning (Good 1984). The mastery method of teaching mathematics has also been successful in conjunction with peer tutoring and in student teaming (Grossman 1985; Mevarech 1981). According to Suydam and Higgans (cited in Weiss 1988) the use of manipulatives in mathematics instruction has resulted in increased student achievement.

The Problem Investigated

For the purpose of Aire Libre's study, gray-area students were defined as students in the regular education program who were intellectually able but performing below grade-level expectations. (Students were assigned to grade level based on chronological age.)

It was hypothesized that gray-area students achieve better academically when they receive instruction using the mastery method of teaching. It was further hypothesized that student attitudes toward mathematics and their own mathematical skills improve when instructional grouping is varied and when instructional opportunities include manipulatives and simulations. Thus, the research question was: To what extent does the mastery method of instruction affect achievement and attitudes about mathematics and performance on mathematical tasks in fourth- and fifth-grade students?

Methods and Data Sources

Aire Libre Elementary School is part of the Paradise Valley Unified School District in suburban Phoenix. Aire Libre has approximately 1100 students of mixed socioeconomic background. Most students are Caucasian with a sprinkling of Native Americans, Hispanics, Asians, and Blacks.

The population in this quasi-experimental study was limited to students in the fourth and fifth grades. The experimental group (N=13) consisted of students in two classrooms, one at fourth grade and one at fifth grade, which were grouped heterogeneously. They received instruction using the mastery method with multiple instructional materials and an emphasis on manipulatives and simulations. In addition, the instructional model moved from whole-group instruction to small groups (3-4

students) formed by identifying student mathematical skill deficiencies on a weekly basis.

The control group consisted of students in two classrooms (N=14), one at fourth grade and one at fifth grade, which were heterogeneously grouped. Students received mathematics instruction through a traditional, non-mastery method. They used the district-adopted Houghton Mifflin mathematics textbooks, levels 4 and 5, in which chapters were arranged according to mathematical operations. They also used drill and practice sheets and limited manipulatives (those used as part of the regular program). Students were evaluated through chapter and teacher-made tests.

Previously identified gray-area students (those students who scored at the 40th percentile or lower on the mathematics composite score of the Iowa Test of Basic Skills administered in April 1988) were placed randomly in each of the four classrooms. District-developed criterion referenced tests were administered to students in both groups during the first week of the 1988-1989 school year to determine student level of mathematical competence.

Teachers in both groups recorded weekly data including daily lesson objectives and any deviations from their planned lessons. They recorded information about instructional methods and materials, instructional group size variations, grouping procedures, the use of the district-developed mathematics scope and sequence, and student evaluation procedures and criteria. At the time of this writing, the research project was still in progress.

Student mathematics achievement in both the experimental and control groups will be measured by the use of an alternate form of the district-developed criterion referenced tests administered in March 1989 as well as the Iowa Test of Basic Skills (mathematics composite) administered in April 1989. Criterion referenced test scores for spring 1989 will be compared with those scores on the alternate test administered in the fall of 1988. Iowa Test of Basic Skills scores will be compared with those of the previous year.

Data analysis will involve computing a grand mean score for all four groups and then determining a mean score for each group for comparison purposes. Analysis of variance will be computed at a significance level of .05. Information about attitudes toward mathematics will be obtained in 1989 through student, parent, and teacher questionnaires.

Expected Results

We expect that the district-developed criterion referenced tests completed in March 1989 and the Iowa Test of Basic Skills completed in

April 1989 will show that the students in the experimental group—those being taught mathematics using the mastery method—will show greater improvement in mathematics scores when compared with the scores of the control-group students—those being taught mathematics using a traditional, non-mastery method.

We also expect that, because of their experiences with manipulatives and simulations and their participation in varied grouping patterns, students in the experimental group will report more positive feelings about mathematics than will those students in the control group.

IMPLICATIONS FOR TEACHERS AND RESEARCH

Student achievement in mathematics is the primary emphasis of this study. An important secondary outcome, however, is the research experience afforded the teachers involved. The activities described in this chapter have fostered an enthusiasm for reading research and examining data at Aire Libre. Members of the Gray Area Committee and the research class have gained confidence using research skills. Participants have recognized that research-based decisions enhance credibility with other staff members, administrators, and parents.

Upon completion of this research project, the Gray Area Committee members will prepare and submit an article for publication. The research class will continue. Teachers at Aire Libre are prepared to become leaders in study groups that will encourage continued professional study.

DISCUSSION QUESTIONS

1. What were the issues/problems regarding gray-area students?
2. What was the purpose and design of the research study?
3. What benefits for teachers resulted from conducting the research?
4. What is your own experience conducting research?
5. What issues could you investigate through a research project with your colleagues? How would you have investigated this issue?

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4. TEACHER PROFESSIONAL DEVELOPMENT THROUGH RESEARCH

by Susan A. Walters

The history of a junior high grouping committee demonstrates the effects that studying research has on the professional development of teachers. The use of research has influenced attitudes, led to exploration of alternative instructional strategies, and encouraged teachers to rethink their beliefs. The process of using the knowledge base to question practice is at the heart of professional development.

> People cannot be developed. They can only develop themselves. For while it is possible for an outsider to build a man's house, an outsider cannot give a man pride in himself and confidence as a human being. These things a man has to create in himself by what he does, he develops himself by making his own decision[s], by increasing his understanding of what he is doing and why, by increasing his own knowledge and ability, and by his own full participation—as an equal—in the life of the community he lives in. (J. K. Nyerere in *Freedom and Development*, 1973)

Thoughtful practice is at the heart of teacher professionalism. A defining characteristic of a profession is the use of a technical knowledge base to solve problems and inform decision making. This paper relies on a conception of teacher professional development as a process of expanding the individual's ability to reflect on practice. The teacher must be a lifelong learner, aware of the continually developing knowledge base for teaching, learning, and instructional techniques. Both theory and research should help the teacher to examine his/her classroom experiences and make instructional decisions.

Numerous writers point out that teachers do not use educational research in this manner. Fleming (1988) cites a number of reasons. Logistics and time present problems for a teacher in locating, understanding, and evaluating research pertinent to a particular issue. Another obstacle is negative past experiences with researchers who seem to lack understanding of the daily realities of schools because they are far removed from classrooms. Teachers often perceive research as inaccessible, irrelevant, and even wrong. Indeed, the findings of individual studies on the same issue often contradict each other (Billups and Rauth 1987). Sawyer

(1987) reports difficulties in applying research to the school setting without a high level of faculty involvement or a clear idea of what to work on and how to proceed.

The Mastery In Learning Project addresses two of these difficulties. First, the Project provides research and practical applications directly to teachers through TRaK (Teaching Resources and Knowledge), the Project's data base. Schools may request packets of information providing overviews on selected topics. In addition, the project consultant in each school locates and disseminates relevant information in a variety of ways including circulation of abstracts or summaries, presentations at workshops, and small-group discussions (Castle 1988).

Second, the Mastery In Learning Project is based on a high level of faculty involvement in determining priorities for school reform. The initial assessment process involves all staff members in both group and individual activities that enable the entire staff to determine priorities for improvement. Teachers then use the knowledge base to address their priorities.

Still, other difficulties with the use of research remain. Eisner (1984) points out that educational research cannot be used prescriptively in quite the same way as medical research, because educational research does not provide a fixed set of rules for effective practice. Teachers must translate generalized research findings and apply them to particular students in particular classes (Munby 1987). Researchers write about abstract propositions in a language far removed from the nuances of the teacher's particular classroom setting, content area, and individual students (Baker 1984; Eisner 1984).

Baker (1984) notes that the movement of research into practice is not a tidy, linear process; the implementation of research findings is not necessarily the result of premeditated, rational decision making. Red and Shainline (1987) found that involving teachers in using theory and research to inform practice is a lengthy process, and significant results may not be evident for several years. Further, conflict between research findings and current instructional practices may represent a direct challenge to teachers' beliefs about teaching and learning, requiring complex personal change.

If research is to affect the professional development of teachers, it must challenge teachers to question their beliefs and practices. This case study examines the effect of research on a particular topic, grouping students for instruction, in a particular setting, Wells Junior High School. It asks these questions:

1. Has the research on grouping caused teachers to re-examine their beliefs about that issue?

2. Are teachers at Wells Junior High now more likely to look to research when making decisions about other issues?
3. Has the research on grouping caused teachers to re-examine their beliefs about teaching and learning?

METHODS AND DATA SOURCES

The author is a teacher who has been a member of the faculty at Wells Junior High since its inception in 1977. She submitted the application for the Mastery In Learning Project and has chaired the Steering Committee since the Project's inception. Much of the information reflects her findings as a participant observer, supplemented by information from other sources.

Several written sources, including the initial assessments and the minutes of the Grouping Committee, offered additional data. An unpublished paper by the project consultant, describing her role as a facilitator of change at the school, provided rich descriptions of some of the key meetings of that committee, as well as considerable insight into factors influencing the committee's decisions.

Surveys offered further insights. I January 1987 and again in January 1989, the Grouping Committee surveyed the faculty about attitudes towards grouping. Also, members of the original Grouping Committee responded to a survey about their attitudes toward grouping and research.

Interviews with two individuals who had undergone recent and significant changes in their attitudes towards teaching and learning provided additional information.

The project consultant and three staff members have read the entire case for accuracy and thoroughness of information and perception. They represent varying degrees of involvement with the work of the Mastery In Learning Project at Wells Junior High.

THE STORY

Wells-Ogunquit Community School District serves the towns of Wells and Ogunquit, adjacent coastal communities in southern Maine. Located just two hours from Boston, both communities have experienced rapid growth in the last 15 years. The tourism industry has replaced farming and fishing as the major source of income. The year-round population of the two communities, just under 12,000 in the winter, swells to more than 40,000 during the summer. When the district built a new high school in 1977, grades 6, 7, and 8 moved into the old high school building and Wells Junior High was born. The school devoted considerable time in its first five years to establishing effective discipline, gathering

materials, and developing and coordinating curricula

By 1985 the school had matured into an effective junior high with approximately 350 students, 40 staff members, an assistant principal, and a supervising K-8 principal. A traditional, hierarchical decision-making structure was used to manage the school. Staff meetings were brief, consisting primarily of announcements read by the administrator, and faculty ensured brevity by avoiding any controversial issues for discussion. Congeniality among faculty members manifested itself in pleasant bantering and generally good-natured faculty-room grumbling. Lecture, seatwork, and worksheets were the primary methods of instruction.

BEGINNING MIL

In 1986, the author, then president of the local teacher's association, applied for the Mastery In Learning Project because of an interest in teacher empowerment combined with a sense that the school had reached a plateau in its development. A change project from outside, validated by the imprimatur of a major national organization, represented a potential catalyst to move the school to a higher level. With little discussion, the faculty voted to accept participation in the Project—the lack of resistance creating an illusion of strong support. The superintendent encouraged the initial application, and the School Committee's approval was quick and unanimous. During the summer of 1986, a new K-8 principal was hired from within the district. He was particularly interested in the position because he felt MIL would give him the opportunity to develop a participatory management structure within the junior high.

One could best describe the first year of the Project, beginning with the needs assessment in October 1986, as "the cotton candy year." Almost everyone was excited about being involved in a national project. In addition to the Steering Committee, two committees began work on the identified priorities: communications and effective grouping of students for instruction. By mid-winter, more than two-thirds of the faculty participated in at least one committee. The Communications Committee improved in-house communication and sponsored two workshops on communication skills. The Grouping Committee read research and gathered information on grouping and scheduling practices.

RESEARCH AND THE GROUPING COMMITTEE

The history of the Grouping Committee most clearly reveals the effects of educational research on the professional development of teachers at Wells Junior High. The existing grouping structure was a modified

homogeneous system. Approximately 35 percent of the students were in two upper tracks, Honors and Accelerated. Five to 10 percent of each class, working below grade level, were in a General group. Random assignment placed the remaining students in one of three Average classes. An introductory foreign language program was available to the upper tracks only. A new gifted and talented program provided enrichment for a handful of upper-track students. Other courses—industrial arts, art, computers, physical education and health—enrolled students from all levels. While these classes were as heterogeneous as possible, the size of the school and the tracking for academics led to de facto tracking in these groups as well.

The Grouping Committee began meeting in January 1987. Nine staff members volunteered, including seven teachers, the assistant principal, and one teacher associate. The committee set three initial tasks: read the research on grouping furnished by TRaK, survey faculty attitudes toward grouping, and survey other junior high/middle schools in the area about their grouping patterns.

Thirty-one Wells staff members responded to a survey distributed in late January. The results of that survey provide some interesting insights into faculty attitudes. Teachers were overwhelmingly in favor of exploring alternatives for grouping. A small majority believed that the existing groups were not effective for academic growth, and a solid two-thirds of the staff believed that the groups did not promote positive social and emotional growth. However, most of the staff favored the continuation of ability grouping. A majority felt that the current grouping was effective for teachers. Most based their opinions about grouping on their intuition and experience as teachers rather than on research, even though most of those surveyed had recently read research about ability grouping and were aware that it did not support homogeneous grouping. Exactly half the respondents supported a move to a more strictly homogeneous grouping system.

The committee continued its work in the fall of 1987 by surveying grouping practices at selected Maine schools. Although committee members felt pressured by a November deadline for a grouping proposal, minutes of the first few meetings reflect little discussion of such a plan. The new consultant attended her first meeting of the committee on October 14. In her journal, she noted a strong thread of uneasiness running through the discussions. Between agenda items, teachers brought up unpleasant experiences with mixed-ability groups, reasons why heterogeneous grouping would not work, or questions about the validity of the research. She described them as a "group working hard at something they didn't believe in" (Wentworth 1988), compelled by the overwhelming evidence in the literature to propose some sort of heteroge-

neous grouping, but not comfortable with the idea. One teacher commented, "If we change grouping, we'll have to change everything." The committee chair, reporting to the Steering Committee a week later, commented that the committee members felt overwhelmed by the sheer number and complexity of other issues related to grouping that kept coming up in their discussions.

On November 4, the Grouping Committee met to formulate its recommendation. After a year of reading the research, they voted to recommend a continuation of homogeneous grouping. It appeared to be a decision made purely on the basis of personal concerns. During the discussion preceding the decision, the consultant mentioned the development of a heterogeneous grouping pilot. She also briefly described Central Park East, an outstanding school that had eliminated homogeneous grouping. Both ideas were meant to stimulate thinking about possibilities; in fact, they evidently contributed to the committee's surprising decision. The teachers, some of whom had originally joined the committee because they wanted the existing Average groups sorted out into high, medium and low, had never envisioned such sweeping changes. There was no discussion at that meeting of the conflict between their personal feelings and the research or the "retreat" caused by the consultant's introduction of a pilot and Central Park East.

The decision came as a shock to several teachers who were MIL leaders, the consultant, the building administrators, and the superintendent, all of whom believed that the negative social and psychological effects of homogeneous grouping made a change necessary. A great deal of soul-searching and some anger resulted; however, at no time was the possibility of overriding the decision suggested.

At the next meeting, the consultant encouraged committee members to reassess their decision. Their reflections revealed the personal fears that had contributed to it. Members discussed their belief that the faculty expected the committee to make a decision teachers would not want. They appeared to be reacting to a belief that many of the teachers were not convinced of the need to change ability grouping and did not know how to modify their instructional techniques to work with mixed groups. Two teachers on the committee described their negative experiences teaching math in schools with heterogeneous groups, partly because they received no training in appropriate methods. Several admitted they had voted to remain with ability grouping because they did not want to teach to mixed groups.

At that meeting, the committee developed a proposal to provide richer educational experiences for all students, regardless of academic group, which was an attempt to address the equity issue raised in the grouping research. The proposal recommended expanded curriculum offerings in-

cluding foreign language classes for all levels; increased art, industrial arts, and computers; and the addition of home economics. It also suggested creation of an eighth period—by eliminating morning and afternoon home rooms—for band and chorus and a structured study time for other students. To provide common planning time for teachers on grade-level teams and to allow truly heterogeneous mixing of students for special subjects, the committee also proposed scheduling academic subjects into specific time blocks. The proposal recommended a pilot to explore alternatives to tracking, without any clear outline as to how it would work. Finally, the committee recommended inservice offerings on expanding instructional strategies for all students.

LIVING WITH THE DECISION

The next four months were difficult and confusing, with no clear sense of direction. With the decision on grouping made, uneasiness prevailed. In retrospect, however, this was a period of quiet germination. Most faculty members were aware that several administrators were in favor of heterogeneous grouping. Those teachers who had never believed the administrators were serious about empowering teachers to make decisions expected them to overrule the Grouping Committee's decision. The credibility of MIL was enhanced as it became clear the decision would stand. The Grouping Committee met and sent out several surveys, including one about adding an eighth period. Some individuals continued to read research on grouping. The assistant principal came to one meeting and commented that he had begun to believe that grouping was not the real issue:

> I think it has to do with how we teach The differences in how we treat different kids There's no reason we shouldn't be teaching all kids in exciting ways, no matter what their ability level is. If we taught differently, a kid's ability level wouldn't matter after awhile (in Wentworth 1988).

While there was little discussion, his comment appeared to provoke thought.

A two-day workshop in late March ended the period of apparent stagnation. Its stated purpose was to assess what was going on in the school, to rethink ongoing projects and identify new endeavors, and to learn about the change process and new roles. The staff agreed to transform faculty meetings into hour-long problem-solving sessions twice a month for the remainder of the year. By providing a regular forum for full-faculty problem solving, this agreement made it possible for the whole faculty to make decisions about issues like grouping, rather than asking a

small group to do so. Some open conflicts developed during the workshop. Confronting personal feelings in a positive, caring way created an atmosphere where individuals were able to talk openly about their fears of change.

On the second day of the workshop, participants again discussed grouping as well as the addition of an eighth period to the school day. One small group developed a detailed proposal for a grouping pilot. The group included two members of the Grouping Committee, three teachers who were opposed to mixed-ability grouping, and five relatively neutral teachers and administrators. It was clear that the reading, soul-searching, and communicating done by the Grouping Committee had an effect (Wentworth 1988). The pilot would serve as a laboratory for teachers interested in working with heterogeneous groups and provide information for non-participating faculty members. Their proposal was to pair teachers with two different ability groups scheduled at the same time, enabling them to mix the groups and split them randomly, working as a team. They would be free to "unmix" if they ran into difficulties or needed a breather (Wentworth 1988). The proposal included training in expanded teaching strategies.

Meanwhile, conflicts prevented the small group working on the eight-period day from reaching such a quick solution. The group referred it back to the whole faculty for discussion at the first faculty meeting in April. Because discussion of the eighth period raised so many buried issues, it took most of the spring to reach a consensus. The staff eventually agreed to start the fall with an eighth period, but to use it for band, chorus, and structured study—not for an advisor-advisee program or exploratory activities, as some had hoped. However, these groups would be heterogeneous within grade levels. Early in the school year, the faculty would develop a plan for other uses of the eighth period with student input.

CHANGES

When school opened in September 1988, a new air of excitement and energy was obvious. Students worked in corridors throughout the school, hanging posters they had made in cooperative groups. In mid-August, the 10 teachers participating in the heterogeneous grouping pilot attended a two-day workshop on cooperative learning as part of their training in alternative instructional strategies appropriate for mixed groups. The previous year, several members of the original Grouping Committee had become interested in cooperative learning while reading Slavin's work (Slavin 1981) After requesting and reading additional articles, they began integrating cooperative learning into their classrooms. Their positive

experiences, discussed in hallways and the teachers' room, generated interest. Mitigating the danger that teachers would simply "layer on" an innovation without questioning its appropriateness in particular cases were regular meetings of the grouping pilot teachers, informal encouragement of reflection by project leaders, and the provision of opportunities for participating teachers to observe each other. Interest in learning about other instructional techniques for mixed groups was evident in teacher requests for presentations on learning stations, experiential learning, games, simulations, and interdisciplinary instruction.

Unfortunately, scheduling problems made it difficult for most of the teachers in the pilot to mix groups as originally planned. Only two teachers were actually teaching to heterogeneous groups during the fall. This difficulty frustrated many pilot teachers, some of whom no longer saw any need to separate students by ability in their particular content area. In addition, a few noted that the lack of positive role models made it more difficult to move away from traditional lecture, drill, and seatwork methods in the lower-level groups.

The actual development of mixed-ability groups occurred in an unlikely place—the eighth period. Regardless of educational philosophy, almost everyone was uncomfortable with the new eighth period. Many staff members had reservations about the activity programs and the new roles and additional preparation time they would require. Others saw daily structured study as unnecessary, not particularly well-suited to the developmental needs of 10- to 14-year-old students, and a waste of time. At a workshop in early October, the staff reached consensus on a plan for each grade-level team to offer activities for students, grouped heterogeneously, based on student interest. The staff agreed to meet again in January to evaluate the plan and consider offering activities across grades.

Beginning in November, all teachers were thus teaching mixed groups one period a day. Many of the activities were simulations involving group work, almost all were active learning situations. While there were predictable difficulties, many teachers perceived this period as a positive experience. For some, it was the first time they had watched mixed groups work together on projects. The seventh- and eighth-grade teams began cross-grade activities during the winter, with plans to involve sixth graders by spring.

The decision of the Grouping Committee in the fall of 1987 to continue homogeneous grouping was a disappointment to MIL leaders. However, it led—albeit by a circuitous route—to change. Having considered the research, teachers began questioning their own practices and the norms of schooling. The next step was learning how to work with mixed-ability groups. The research on grouping quite obviously triggered the interest in cooperative learning. It was the equity issue raised in the liter-

ature that led to the suggestion of an eighth period as an effort to provide more opportunities for all students.

Another body of research guided the evolution of eighth period. A large portion of a two-day workshop in November featured presentations on the cognitive, social, emotional and physical development of 10- to 14-year-olds in response to teacher requests for research findings about the developmental needs of this age group. Since that time, teachers have referred to information from the workshop frequently in decision making at faculty meetings. One team leader's minutes, referring to a new issue raised for discussion, included the comment that the team will need to consider what "research says" on the topic. This organic change is occurring at a pace that respects the comfort levels of individuals and is, thus, far more likely to have lasting results than any imposed plan, even one designed by a group of fellow staff members.

It is important to note that, for the most part, teachers at Wells are "second-hand" consumers of research. Although research has lost its negative connotation, no longer referred to as "junk" as teachers begin to see uses for it, reading research is not a habit for most. While research articles on a variety of topics are conspicuously available in the faculty room, most teachers feel that they do not have the time to read them, although they now readily engage in conversation with those who do. Seven or eight individuals, including the two building administrators, the consultant, the guidance counselor, and a few teachers, read research more actively. They frequently "seed" ideas in informal discussion with others. The teachers in this group are all involved in leadership roles and, as graduate students, have access to research. Their interest in research has helped make it a part of daily conversation, increasing its accessibility for reflection and decision making. Many teachers rely heavily on the consultant when seeking specific information, alleviating the logistical and time problems that often work against the location of research. Thus, research has come to play an important role in the culture of the school.

DISCUSSION

Study of a change process from the perspective of the effect of research on teacher professional development necessarily provides a limited view. Examining the same circumstances using different frameworks would provide other, equally valid insights. One could view this case through the frameworks of the effect of teacher empowerment on school culture, organizational development theory, or change theory. Selecting one framework forces the observer to leave out significant contributing factors. It was not just the exposure to research that affected the profession-

al development of teachers at Wells Junior High. However, it is apparent that research did have an impact on teacher attitudes towards grouping, and that teachers are now more likely to refer to research in making decisions. Reading research had a significant impact on some teachers' beliefs about teaching and learning.

The Grouping Committee re-issued its survey on attitudes towards grouping in January 1989. On the second survey, slightly more than half indicated that they were not satisfied with the existing student grouping and did not believe it promoted social/emotional growth. One question asked whether the school should eliminate ability grouping. In 1987, only seven out of 31 agreed. In 1989, 10 out of 23 were in favor of eliminating tracking. Teachers were still overwhelmingly in favor of exploring alternatives to existing grouping patterns. A major shift in teacher attitudes appeared in the responses to the question asking teachers whether they were in favor of a change to a more homogeneous grouping plan with six ability tracks instead of four. In 1987, half the respondents were in favor of this option; in 1989, it was supported by only one out of 22.

In examining the results of this questionnaire, we must note that by September 1988, a slight but significant change had already occurred in the grouping structure. Scheduling academic subjects for individual grade levels in the same time block, instituted to provide common planning time for grade-level teams of core subject teachers, made truly heterogeneous grouping possible. Thus, when teachers reported satisfaction with the current method of grouping, the method they supported in 1989 was different from what was in place in 1987.

A section added to the 1989 questionnaire asked teachers to select the method of grouping they preferred from four alternatives. The first, homogeneous for all subjects, was chosen by two. Six teachers selected the second option, homogeneous for academic classes, heterogeneous for specials. Fourteen teachers chose heterogeneous groups for specials and some academics combined with homogeneous groups for certain academic classes. For this choice, respondents were asked to indicate which subject(s) should remain homogeneous. Most (11) named math. The final choice, heterogeneous for all subjects, was favored by six respondents. By 1989, teachers were aware of a wide range of grouping alternatives; it was no longer necessary to choose between completely heterogeneous or completely homogeneous grouping. These factors may explain why more than half the teachers were still opposed to eliminating ability grouping in 1989, yet a large majority (24-3) indicated an interest in continuing to explore alternatives to the current grouping structure. Thus, attitudes about grouping appear to have changed considerably since the research on grouping was first presented.

By January 1989, research played a more significant role in teacher dis-

cussions and decision making at Wells Junior High. A majority of the staff (19-8) had read research on grouping within the past year and agreed that the research did not generally support tracking. A survey of the members of the Grouping Committee, also done in January 1989, indicated that reading the research on grouping had influenced their instructional practices. All four committee members agreed that they were somewhat more likely to use research findings in making instructional decisions.

Stronger evidence of the increased teacher use of research is provided by two specific examples. The first is the interest in cooperative learning discussed previously.

The second is the interest in research on the developmental needs of 10- to 14-year-old learners, the focus of a staff workshop in November. In January 1989, the faculty adopted a mission statement for the school at the request of members of the grouping pilot, who felt they needed a basic framework to guide their explorations. It states that "the mission of Wells Junior High is to create a school that is appropriate to the developmental needs of 10-to 14-year-olds within a learning atmosphere that is productive and enjoyable for students and adults." The consultant reports frequent references to "what we know about the needs of the age group" in informal discussions and at team meetings. References to research occur in the minutes of grade-level team meetings.

For some staff members, a new awareness of research challenged their beliefs about teaching and learning. One teacher stated that the research caused him to question the practice of homogeneous grouping: "If there is so much research and questioning [of tracking], then I need to re-examine my beliefs." Questioning grouping also led to examining other beliefs. The assistant principal reported such an experience. Research had little impact on his classroom practices when he was a teacher at Wells, before becoming an adminsitrator. About a year prior to the organization of the Grouping Committee, he worked on a project analyzing grouping practices around the state for the Maine Elementary Principals Association. His original intent was to develop a rationale for homogeneous grouping. He learned, however, that there was little research to support tracking, and he began to realize that it often had negative effects on psychological and social development. A quiet, reflective individual, he did not, at that point, share his growing concerns with faculty members. He was pleased when the faculty chose grouping as an area of concern, and he became a member of the Grouping Committee, playing an active role in discussions. His graduate work and continued reading led him to look at differing teacher expectations for tracked classes. His supervisory responsibilities gave him the opportunity to reflect on the instructional techniques used with different ability groups. As a member

of the Grouping Committee, he was able to share these ideas with his colleagues, providing support for their exploration of the equity issue and alternative instructional techniques.

For others, the conflict between research and practice was more painful. Another teacher, who has been at Wells Junior High since its inception in 1977, described her initial reaction to the research on grouping as "scared and resistant." A competent teacher with a strong knowledge base in her content area, she relied on traditional instructional methods. When she completed her Master's degree several years earlier, she incorporated some instructional techniques she learned from research such as questioning strategies. Generally, however, she characterized herself as someone who "tends to stay with what's safe." Until her involvement with the Project, she was comfortable with the way she taught, feeling that "kids were getting what they need and being successful." She sometimes looked to research when it appeared to offer a solution to something she was already perceiving as a problem. If it questioned something she was doing, she tended to dismiss it, since "these people haven't been in the classroom."

However, the research on grouping and on the developmental needs of 10- to 14-year-old learners had a major impact. The new information caused her not only to question her beliefs about teaching and learning, but also her sense of self-worth. She stated, "...Last year was full of self-doubt. Was I a good teacher? I didn't feel like I was. [It was] all of the information about what is best for kids and how they learn. What I was doing didn't seem to jell with what 'research says'. I thought I was a good teacher all that time. Then 'research says' I wasn't. It blew me away emotionally." As a result of this personal crisis, she "jumped in with both feet," making major changes in her classroom in the fall of 1988. She attended the August workshop on cooperative learning and began using those strategies, inviting the consultant to observe her and give her feedback. She admits to continuing self-doubts when new methods do not work out quite as she planned, but she continues to discuss and reflect on her practice in light of her new knowledge.

CONCLUSION

At Wells Junior High, research has become part of professional practice as teachers grapple with the issue of implementing generalized findings within the context of their own particular students in their own particular classrooms. The research on ability grouping has influenced the attitudes of staff members and led to the exploration of alternative instructional methods. For some, the research has led them to rethink their

beliefs about teaching and learning. Indeed, the greatest value of research may reside not in the provision of definitive answers for practitioners, but in the questions it provokes. The process of using the knowledge base to question practice is at the heart of professional development.

DISCUSSION QUESTIONS

1. What was the original problem identified by the Wells faculty?
2. What other issues surfaced while the faculty was working on the original problem?
3. How did research and reflection intertwine in this example?
4. What does "using the knowledge base to question practice" mean to you? How is it present or not present in your work?

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5. DEVELOPING COLLEGIALITY AROUND RESEARCH

by Nel Ward

At a large high school, changes in professional interaction have resulted from collegial sharing of the knowledge base. Survey results indicate that individual teachers now talk and read more about teaching and learning. They also feel more confident and have higher self-esteem. Workshop and conference attendance and dissemination of information have increased. Instructional strategies have improved. Leadership is shared by more faculty members. A collegial organizational structure has been developed.

In prehistoric times, isolation from the group led to death. A person driven from the fire would find no way to be sustained in such life-giving necessities as warmth, food, and shelter. Although isolation may no longer result in this drastic consequence, it can create stagnation that detracts from one's ability to perform tasks.

One place in which isolation has a crushing effect is today's large high school. Among contributing factors are curricular departmentalization and bell schedules that cut teaching time into discrete chunks. Recent studies show that teachers inhabit private worlds entered only by students (Feiman-Nemser and Floden 1986, Goodlad 1983; Sarason 1982). According to one survey, only one-fourth of the teacher participants reported "much contact" with colleagues and almost half reported "no contact" (Lortie 1975). When teachers do interact, their discussion is usually not about instructional practices. "Commonly, lunchroom talk deals with politics, gripes, home life, and the personalities and family background of individual students . . ." (McPherson 1972).

Collegiality has been identified as a basic characteristic of schools demonstrating improvement in student achievement (Little 1982; Rossman 1985; Tye and Tye 1984). According to Little, teachers in more successful schools discuss, design, conduct, analyze, evaluate, and experiment with their teaching. This type of collegiality is necessary if teachers are to engage in the process of shared decision making and develop the teacher empowerment vital for school improvement (Maeroff 1988). Such collaboration must move beyond merely trading stories about problems with students into help-related exchanges so that teachers can set school goals and oversee their own professional development (Smith 1987).

A premise of the Mastery In Learning Project (MIL) is that teacher empowerment develops through collegial examination of knowledge-based approaches to faculty-determined priorities. From this examination evolves a professional culture centered around mutual inquiry.

The purpose of the present study is to examine, in one MIL high school, the collegial changes resulting from teacher interaction around the knowledge base. It describes: (1) transformations in professional interactions since the beginning of MIL; (2) attitudes of high school teachers toward these changes; and (3) developing collegiality through teachers' heightened awareness of and willingness to share the knowledge base regarding teaching and learning.

METHOD

Participants and Setting

Maryvale High School, located in Phoenix, Arizona, is a 25-year-old urban school. Of the approximately 2300 students, 51 percent are Caucasian, 11 percent Black, 35 percent Hispanic, and 3 percent other (e.g., Native American, Asian). Approximately 11.6 percent of the students attend a district vocational school for part of their classes.

The Maryvale teaching staff of 111 includes 101 classroom teachers, seven counselors, and three media specialists. The faculty is considered quite "mature"—only 12 teachers are under the age of 30, while 37 are over 50. Instruction within the 14 subject-area departments is largely traditional.

During the past decade, the school has undergone radical demographic changes. The number of minority and/or low-socioeconomic students has doubled. At the same time, the number of students who attend college after graduation has declined from 74 percent ten years ago to 33 percent last year. The current dropout rate is more than 10 percent, and 46 percent of the seniors do not graduate. The daily absence rate averages 12 percent.

Procedure

Questionnaires were sent to all 111 teachers at Maryvale, interviews were conducted with 20 teachers, and comparisons were made regarding changes in the way teachers exchange knowledge about their craft since MIL's inception. Both types of data sources—interviews and questionnaires—were used to increase the validity of the results (Zeichner, 1979).

Questionnaires included information about the teacher's subject area, number of years teaching at Maryvale, in the district, and total years

teaching; number of professional journals read currently and in the past, participation in workshops currently and in the past; numerical ratings for statements about collegiality and the teacher's understanding of the knowledge base, and subjective comments Forty-six teachers (41%) responded; five responded to portions of the questionnaire, only.

The 20 teachers interviewed have taught at Maryvale for four years or more; they comprised one-third of the teachers in that category. Subjects ranged in age from 32 to 64 with an average of 45 years. Teaching experience varied from eight to 36 years with an average of 21 years.

During the semistructured interviews, subjects were asked to discuss changes in individuals and in the school since the inception of MIL. The questions focused particularly on collegial sharing of the knowledge base. Interviewees posited reasons for the changes, each estimated the percentage of school time spent in collegial interaction presently and before MIL began, and the number of professional staff involved in collegial interaction during those time periods.

Additional data concerning the formal structures of teacher interaction before the beginning of MIL and at the current time included the number of teachers involved in alternative instructional programs, organized staff development, school improvement programs, and decision-making bodies.

Analysis

Data were divided into four primary categories: description of the school, individual changes, school changes, and reasons for these changes. Descriptive statistical analyses were conducted on the numeric data. The number of workshops listed was totalled.

Summary statements from interviews were assigned to one of three categories: individual change, school change, and reasons for change. Tallies were made for each summary statement. Those statements made by three or more respondents were included in the results.

Programs and committees for staff development, alternative instruction, and school improvement and the number of people involved on these panels were identified for the year preceding the inception of MIL at Maryvale and compared with those in the current school year.

RESULTS

Description

The MIL design required that all faculty members participate in the initial assessment and goal-setting process. Following this mandatory exercise, participation in MIL was voluntary.

Sub-committees addressed faculty priorities identified from the assessment. Improvement issues included at-risk students, self-esteem, and student achievement. An elected Steering Committee of 15 teachers coordinated the school improvement process.

Teachers were unaccustomed to exploring research. Sub-committees did not form until second semester. Consequently, during MIL's first year, most of the research-based collaboration occurred among Steering Committee members. To involve additional people in the collegial relationship, the Steering Committee determined that one-third of its membership should change each year and only one member of the Steering Committee could be a department chair.

Sub-committees reorganized in the fall and continued to explore options for addressing priorities. Teachers initiated or expanded experimental programs for improvement, and many committee members gained a feeling of accomplishment. In early spring, a one-day retreat for the Steering Committee provided time to revise the mission and philosophy statements prepared before MIL and the goals identified since MIL, subject to full-faculty review. In late spring, the faculty received a second school profile, prepared by the consultant, based on questionnaires from half the faculty and 10 percent of the student body and interviews with school and district administrators.

The faculty worked to expand its available resources In addition to research available through TRaK, the Project database, the consultant collected information related to school priorities. The school library acquired access to the ERIC data base and ordered books and journals, the library currently subscribes to 36 professional journals.

To disseminate knowledge-base information, a Maryvale teacher began writing one- and two-page abstracts of journal articles, conference papers, and pamphlets. The entire faculty received these periodic *Updates* which covered 29 topics including learning styles, effective teaching, at-risk students, critical thinking, cooperative learning, and student learning. In their second year, the *Updates* also provided faculty members with evaluation information about programs at the school and district statistics regarding such student problems as absences and dropouts.

Individual Changes

Data from the questionnaires revealed interesting changes Thirteen teachers (28%) reported that they talk more frequently with their colleagues at Maryvale, almost double those who indicated no changes at all, with 18 teachers (39%) indicating little or some increase (see Table 1). Although talking with teachers at other schools showed a smaller increase, the questionnaires revealed that 16 teachers (35%) do talk more

with other educators outside their school "some of the time" or "more frequently" than they did two years ago. Reading about teaching and learning showed the greatest change with only eight teachers (17%) indicating no change and 28 teachers (61%) reporting some degree of change.

All but three respondents (7%) indicated that they read the *Updates* at least part of the time. Those who stated that they read these abstracts "frequently" represented half of the responses. Respondents described *Updates* as "right on target and . . . up-to-date on the research," showing "research on how kids really learn and the best teaching methods for teaching them to learn." One respondent "kept them for quick reference in research."

One pattern emerged in data from teachers assigned to Maryvale for more than 20 years. Although the number of years in teaching differed greatly among those who reported increases in their learning about the knowledge base and their discussions with others, two-thirds of the teachers who made negative comments on the questionnaires or showed a lack of interest in investigating research had been teaching at the school for more than 20 years, and another one-fourth had taught at Maryvale from 11 to 20 years. It appears that teachers relatively new to the school are less opposed to investigating the knowledge base and sharing information with colleagues. Another pattern resulted from analysis by subject area. Math teachers showed the greatest number of years at Maryvale and the most negative comments on the questionnaire.

The only item on the questionnaire that revealed no change was the number of journals read monthly. Nine teachers (20%) read more journals in the past, eight read fewer, and 29 (63%) read the same number, with half the respondents reading either none or one journal monthly.

Individual changes fell into three categories: increased knowledge, sharing and involvement, and personal and professional growth. Teachers currently believe that they "know much more about teaching strategies than in the past" and "the research has changed many of my opinions about teaching and learning." "Research has begun to answer questions I've always worried about."

According to the interviews, teachers believe that the increased knowledge makes them more effective in the school district. Because of their reading, they have become more aware of the latest educational research and therefore can not only improve their teaching with this knowledge but also add to the body of knowledge. As one teacher explained, "Before MIL, I had not read a research article since college 12 years ago. I lacked time and comfort with the reading. As a result of my reading, I compiled statistics for my program [with at risk students] that I never would have before."

Table 1
RESPONSES TO QUESTIONNAIRE STATEMENTS

Statement	No Res	No	Little	Some	Freq	Mean*
	1	2	3	4		
I read the *Updates* that are published weekly	0	3	9	11	23	3 35
I discuss the *Update* information with other teachers	0	10	20	13	3	2 20**
I investigate information about teaching and learning in the school library	0	28	8	4	6	1.74
I investigate information about teaching and learning outside the school library	0	7	13	18	8	2 54
I incorporate information in my teaching strategies	1	12	10	14	9	2 42
I talk more about teaching and learning with Maryvale teachers than I did 3 years ago	0	7	11	10	13	2 73
I talk more about teaching and learning with teachers in other schools than I did 3 years ago	4	14	12	7	9	2 33
I read more about teaching and learning than I did 3 years ago	4	8	18	10	6	2 39
I am interested in more information about teaching and learning	Yes 19 (41%)			No 27 (59%)		

*Respondents used a four-point Likert scale Not at All = 1, Infrequently or Little Change = 2, Some of the Time or Some Change = 3 and Frequently or Great Change = 4

**Two respondents to the questionnaires placed the number 5 at the end of the continuum, although the largest number provided to them was 4, with the statement that they read the *Updates* "all the time" rather than frequently

With increased understanding of research came the teachers' ability to use their expanded knowledge about teaching and learning. Teachers could share their ideas and experiences, a practice that reinforced their positive teaching strategies. "I am more likely to ask someone for help . . ." was a reaction to the sharing of the knowledge base. Another change is reflected by the statement that "you felt in the past as if you said anything, you were wrong."

Teachers indicated that they no longer talked solely with members of their own department; an understanding of the knowledge base promoted discussions with a number of teachers with whom they had not talked before. "Doing something together and being involved" was a situation not "allowed" before the development of collegiality at Maryvale.

However, this greater involvement resulted in increased polarization between faculty members interested in the new collegiality and other, more negative teachers. The former tended to associate with colleagues they believed to be "doers and busy," gravitating "toward positive people and those who are growing." No longer, for example, would one teacher "allow negative people to push me back into my shell."

Individual growth resulting in increased confidence and belief in one's leadership skills is another change revealed by the interviews. Despite the "frustration and inner turmoil" from stretching personal comfort zones, teachers expressed intense pleasure at their personal and professional development, believing that "future years will profit from this one." One teacher said that she would hate to return to "the static feeling of the past."

One finding from the interviews appeared to contrast with studies indicating that increased years of teaching experience create a tendency to reject innovations and alterations in educational policy (Barnes 1985). Both interview and questionnaire data suggested that, the longer the interviewees had been *at the school*, the more negative or indifferent they appeared to be toward school changes. It might be that the rejection of change is related to the number of years assigned to the school rather than the number of years in the teaching profession

School Changes

The number of workshops and conferences attended by teachers clearly reflects increased collegiality during the past three years. Twenty-five teachers, more than half those responding to the questionnaire, indicated that they had participated in no workshops three and four years ago. The number of teachers not attending any workshops or conferences declined by more than half to 11 (24%) during the past two years. The total number of workshops for 20 participants three and four years ago was

38. That number increased by more than 250 percent to 96 during the past two years.

Observable changes also occurred in the number of people who are reading about teaching and learning, sharing knowledge with others, and using what they have learned in their teaching. Although only 10 (22%) indicated some or frequent investigation of the knowledge base in the school library, 26 (57%) of the teachers stated that they researched information some of the time or frequently. Half the respondents incorporated this information into their teaching strategies either some of the time or frequently.

The change in instructional methods indicated by the questionnaires was also apparent in the interviews. Teaching strategies included "more hands-on involvement, more individual evaluation of student achievement, more students involved in individual and group activities, and less lecturing." Teachers unaccustomed to the higher number of low-ability students now attending Maryvale indicated that they are more deliberate in their search for appropriate textbooks and student activities.

All who experienced the increasing sense of collegiality appreciated it. One teacher described the change as analogous to the yeast of collegiality "rising to the surface and breaking through the hard crust of people who didn't talk and who were more nontrusting and judgmental." In the past, it seemed that teachers had a "you're doing it so I'm not going to do it" attitude or indicated that "I learned the hard way—now you're on your own and you learn the hard way." According to several interviewees, collegial teachers now treat others with dignity and respect, accepting divergent opinions.

Although some faculty members still complain, the verbal "kid-bashing" has decreased, replaced with "quality talk" about how to help students achieve better—"about what works and why it works." The result is "an overall positive feeling on campus."

Increased sharing has encouraged more widespread leadership. In the past, the school was "traditional, dictatorial, top-down, subversive, undermining, negative." Departments made separate recommendations to the principal, sometimes factions were set against one another. Currently, sub-committees on school priorities develop a cross-curricular perspective with recommendations made for the good of a school rather than for the benefit of only a small part. Before, "a few [teachers] were always in control, always the same in-group" with the remainder not allowed to participate in decision making. "Maryvale has opened up leadership to whomever wants to take it and get involved."

Participants in the interviews estimated the percentage of Maryvale teachers who were involved in collegial interaction four years ago and during the current year. The percentages of collegial teachers in the past

ranged from 0 to 50 percent with 60 percent of the answers in the 0-5 percent range. The percentages for the current time varied from 30 to 75 percent with one-third of the responses at 50 percent or above.

The expansion of leadership and involvement is apparent in the increased numbers of programs and of people involved in these programs within the past four years. Prior to MIL, collegial interaction was promoted only for the department chairs, the district-mandated school improvement team, and the three teachers elected by the local union membership to make recommendations regarding school policies and procedures. This involved only about 20 people. No understanding of the knowledge base was required for decisions, and almost no discussion of teaching and learning occurred among the participants either within meetings or at other times.

Four years ago, staff development was coordinated by administrators and consisted of training in the Madeline Hunter model (which was mandated for department chairs), participation in Investment in Excellence and two other workshops for developing leadership through enhanced self-esteem, and speeches by education authorities about four times annually. One teacher operated a pilot program for students in science, and another worked as coordinator between the school and district programs designed to decrease chemical abuse. Department chairs disseminated information in their role as teacher leaders. Goals reflected the need to improve attendance and student achievement, but the faculty received only limited information about effective school improvement techniques.

During the current year, 83 teachers participated in 17 programs and 10 committees to increase student achievement and improve student and teacher morale. Of these 83 teachers, 37 assumed various leadership roles. Inservice opportunities expanded to include workshops on Teacher Expectations and Student Achievement (TESA), cooperative learning, cognitive mapping, research reading, effective schools, at-risk students, teacher mentoring, and freshmen support programs. In addition to teachers in leadership positions participating in national workshops, nine other staff members (three of them in their first year at Maryvale) attended out-of-district workshops, and 30 others attended in-district workshops.

Thus, the 200 percent increase in teachers involved in leadership positions and the 415 percent increase in teachers participating in the school's formal collegial structure demonstrated a change in collegial patterns. The additional 10 committees and 15 programs showed a remarkable increase in vehicles for collegiality.

Shared leadership was apparent in representation of MIL on the administrative staff council and the opportunity for a Maryvale teacher to

participate in selecting a new principal. Teachers have initiated publications for the faculty, and they are becoming more knowledgeable about selecting inservice experiences.

Reasons for Change

Summary statements from the interviews revealed five main categories of reasons for change: changes in student population, shared leadership and collegial groups, dissemination of information, organizational structures of the school, and attitudes resulting from attempting collaboration.

Teachers have recently sought assistance through mutual consideration of problems and solutions to meet the needs of a changing student population. The shared need for specific materials and teaching techniques has resulted in many exchanges. Teachers ask, "What can we do about this, what can we do about that?" With this internal awareness "that something had to be done" also came a "gentle [external] pressure" to reduce dropout and absence rates.

Shared leadership between principal and teachers was another reason that interviewees cited for changes. A principal who "doesn't tell [but] asks and works through key people who communicate well" has increased the rate of change. "The principal spread out the decision making which is good psychologically." Teachers feel that they work better through plans that they have developed. According to one teacher, "The principal makes me feel comfortable being places other than my department."

Dissemination of information has reduced the teachers' feeling of isolation. They discuss the *Updates*, whether the information comes from published materials or reports of Maryvale programs. "In the past, leaders were given information and expected to disseminate it. Now everybody gets it." The more the teachers have learned about the knowledge base, the more they have changed perceptions about teaching and learning, realizing that they have the ability to improve their teaching. With research "distributed in little bites," teachers have time to read and discuss the ideas. Getting feedback from statistics produced by the district such as those on dropout and absence rates allowed teachers to operate from knowledge, not ignorance.

The fourth reason for change is organizational structures. A large number of teachers worked in committees and investigated the knowledge base on teaching and learning. "Until three years ago, few teachers were involved other than department chairs. "The rest of the people just sat." "Change has come from an increased number of faculty involved in programs. Now there's something for everyone." Teachers volunteer

in areas of interest rather than being assigned to something about which they may be indifferent.

Because of a mentoring program, new teachers were "absorbed into the mainstream of collegiality" through a system of immediate contacts among teachers who reflect care and concern. Teachers, both continuing and new, also had a much greater opportunity to attend a variety of professional workshops than in the past. TESA provided the opportunity for teachers to observe colleagues in other curriculum areas, creating a "whole different atmosphere and attitude."

Social interactions to encourage collegiality may not succeed because they have no end purpose. With improvement of the school as a goal, however, teachers have a reason to interact, and the knowledge base gives them a shared basis for this interaction.

The last reason for change was an emerging climate for change itself. Although differences were barely discernible during the first part of MIL, the "snowball" effect became evident after the first two years. As one teacher commented:

> Changes are geometric. They take a long time, and then they move faster and faster MIL has developed a tremendous number of leaders. People are no longer afraid of the negative and have come out of their isolation and really enjoy it. Teachers are beginning to turn against the negative faction that has run the school all these years The difficulty with the school when I came here ten years ago is that as the District built new schools and developed new programs, many of the good teachers left The burned-out, angry teachers stayed and created a hostile environment Fortunately, many of these teachers are beginning to take pride In the past, Maryvale was considered by the district to be the worst school, the dumping ground for teachers who got out of line elsewhere. We were always the last to get anything. That has turned around to where the district considers us the best school in the district.

The success that teachers feel as they try new strategies keeps building and bolstering their morale. They have developed pride in believing that they can improve the school. With this pride comes the sharing of successes and accomplishments—sharing as the norm rather than an unusual experience.

Glatthorn (1987) outlined a process instrumental in the formation of cooperative professional development. The first step presents external knowledge. In the second step, members of the group "analyze, not dispute, the external knowledge." The final stage draws the discussants into the future as they connect the knowledge and school practices. Maryvale's experience parallels Glatthorn's process.

CONCLUSIONS

Exposure to the knowledge base has inspired teachers with the optimism that something can be done to improve the school. By sharing their increased knowledge and its application to the school's problems, teachers at Maryvale experienced individual change and, as a result, changed the structure of the school for greater collegial interaction.

Individual changes included increased self-confidence and self-esteem. Teachers believe that they can offer valuable contributions to the teaching profession and have the right to express their opinions regarding what they have learned. As might be predicted, teachers who participated in the design and implementation of successful programs developed self-esteem from their increased achievement (Sinclair 1985).

School changes included a shared decision-making process with the principal and a broadening of the number of leadership positions. Sharing teachers became less protective of their turf, exchanging ideas more openly. An understanding of the knowledge base about teaching and learning gave teachers a greater sense of equality with administrators because they shared a common language and understanding of educational problems and reform.

Wide dissemination of information was essential to these changes. Giving materials only to department chairs to distribute or discuss perpetuated a top-down approach rather than the "we are all equal" attitude that comes from a distribution of information to all teachers. The new sense of equality among staff members has allowed greater latitude in pursuing common goals for all students. Teacher autonomy is enhanced when teachers conduct their own inquiry rather than receiving information from individuals in relatively high positions (Erickson 1986).

Another essential element in developing collegiality at Maryvale was the expansion of leadership beyond the position of the department chair. When leadership was offered to—almost thrust upon—other teachers in the school, they developed their leadership potential outside as well as inside the classroom.

Developing cross-curricular committees for the betterment of the school community was another positive force in expanding teacher collaboration. The exploration of shared concerns with those in other disciplines encouraged a new sense of commonality.

Several implications for further research are suggested. Additional study is needed in schools with varying degrees of success in developing collegiality to further determine the barriers and the facilitating conditions. Most studies examining teacher collaboration focus on collegiality through peer observations (Halkett 1988; Kent 1985; Little 1985) rather than the structures for sharing knowledge. An examination of several

schools involved in a process similar to Maryvale's would add to our understanding of the complexities involved in developing collegiality around research and the knowledge base. Finally, participation in MIL may have provided a Hawthorne effect that could diminish after the Project's completion. Longitudinal data is needed to determine long term changes.

DISCUSSION QUESTIONS

1. What was Maryvale's major issue?
2. What were the process outcomes for the faculty?
3. What were the outcomes for students?
4. What were the reasons for increased professionalization?
5. Compare these experiences with your own.

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6. FACULTY DECISION MAKING: SOURCES OF INFORMATION

by Joanne Schnesk and Gary Rackliffe

Teachers from 26 schools were interviewed around the question, "What sources of information have you used to make informed decisions regarding improving your school?" Three main sources are discussed. ethical reasoning, disciplined inquiry, and practical experience. Problems arose in applying general research findings to particular situations. Teachers' practical wisdom bridged this gap. creating a new knowledge applicable to their unique circumstances. Teachers need time and resources to use and create research-based, practical solutions to problems. Research needs to be relevant and user-friendly. University-school cooperation needs to be strengthened.

One of the premises of the Mastery In Learning Project (MIL) is that school-based reform decisions should be built upon thoughtful consideration of options and the research that supports those options. This premise seems like a "given," but studies and literature reviews by Casanova (1989), Eisner (1984), Fleming (1988), Florio-Ruane (1986), and Shulman (1981), have shown that teachers often do not refer to research findings when making decisions regarding their students' and their own development. MIL has endeavored to counter this trend by providing research assistance on requested topics to the schools in the MIL network. The study described in this chapter investigates the ways in which research and other forms of information have been utilized by teachers involved in MIL.

Why are teachers not using research? The causes are many and varied. In a review of the literature on research use, Fleming (1988) identified 14 common obstacles to research use by teachers. Among them were teachers' skills and interests, perceptions of research utility, time limitations, workplace conditions, and need for directly applicable information. While Fleming's list explains why teachers tend not to regard research as their first source of knowledge, it does not capture the dilemmas that teachers face when making decisions.

To understand those dilemmas, we must first define the role of the teacher. Panel 6 at the 1974 National Institute of Education's Conference formulated a definition that remains, to a great extent, relevant for today's teachers. They stated that a teacher is "responsible for (a) aggre-

gating and making sense out of an incredible diversity of information sources about individual students and the class collectively; (b) bringing to bear a growing body of empirical and theoretical work constituting the research literature of education; and somehow (c) combining all that information with the teacher's own expectations, attitudes, beliefs, purposes . . . and (d) having to respond, make judgments, render decisions, reflect, and regroup to begin again."

The writers of this definition recognized that teaching *is* difficult. The demands of the profession leave little time or energy for anything that is not immediately applicable to the classroom. Research does not provide the instant solutions that teachers require when juggling their roles (Casanova 1989, Fleming 1988), consequently, teachers turn to other sources of knowledge when making decisions. In doing this, they are not rejecting research, but rather relegating it to a place of importance but not urgency.

What sources of knowledge *do* teachers rely on to make daily decisions? Researchers have recognized that empirical evidence alone is not sufficent. As Eisner (1984) relates, "theory and generalization from educational research can provide a guide—but never a substitute—for the teacher's ability to read the meanings that are found in the qualities of classroom life" (p. 452). Although it is difficult to specify that alternative body of knowledge, researchers have begun to study the issue and formulate theories to answer the questions: "What are the sources of knowledge? What does a teacher know and when did he come to know it? How is new knowledge acquired, old knowledge retrieved, and both combined to form a new knowledge base?" (Shulman 1986, p. 8).

Shulman (1986) has developed a taxonomy of knowledge for teaching. He and several other researchers have taken particular interest in the sources of knowledge that teachers refer to for the daily operation of their classrooms. Terming this vast pool of knowledge *content knowledge*, he postulates that it is organized in several forms, one of which is *propositional knowledge*—sets of assertions about teaching. (For a complete description of the taxonomy see Shulman 1986.) Several examples of propositional knowledge are a research-based metacognitive reading strategy, the practical suggestions of the teacher next door, and the personally-held value of equal educational opportunity. Teachers derive propositional knowledge from three basic information sources. *disciplined empirical or philosophical inquiry*, *practical experience*, and *moral or ethical reasoning*. Shulman's taxonomy illustrates that teachers must utilize a variety of information. Empirical knowledge alone is not sufficient. The practical knowledge gained through experience, as well as the moral or ethical reasoning that leads to norms of fairness, equity, and justice, enables teachers to handle myriad responsibilities daily.

Two other researchers have been studying the need for an alternative body of knowledge in addition to research-based information for teachers. Buchmann (1986) contends that this alternative body is comprised of four interdependent categories—*folkways of teaching*, *local mores*, *private views*, and *teaching expertise*, and provides "the light that teachers live by" (p. 7). Elbaz (1983) has found that teachers possess a "wide-ranging knowledge" oriented to the practical situation. This *practical knowledge* integrates the teacher's theoretical and experiential knowledge with personal values and beliefs.

While these researchers approach the issue from slightly different perspectives, they draw the same conclusion. *teachers employ a variety of sources of knowledge when making decisions about teaching and schooling.*

And so we return to the purpose of this study. Is research being used by teachers involved in MIL? Have the unique features of MIL that provide resources and the time to use them increased research use by teachers? Have teachers become more willing to see research as having both importance and urgency? The data collected in this investigation give an indication of the receptivity of MIL teachers to the use of research.

METHOD

This report is based on a series of telephone interviews with teachers who chair MIL committees in their schools. They have an average of 14.6 years of experience, with a range of 3 to 30 years. Academically, 58 percent of the teachers interviewed are working on or have completed advanced degrees.

The teachers interviewed were selected randomly from the 16 schools that responded to our request for information regarding teacher names and convenient calling times. They represented seven elementary schools, two junior highs, two middle schools, three high schools, one kindergarten to eighth-grade school, and a kindergarten to twelfth-grade school. The number of teachers interviewed from each school ranged from one to four, but each represented a different committee

The telephone interviews were based on a group of open-ended questions that asked about committee activities, their meetings, and the kind of information used in decision making. The two interviewers (the authors) conducted one interview together and discussed interviewing practices throughout the interviewing process to ensure comparable results. We took notes during the interviews and, with the permission of the teachers involved, tape recorded each call for future reference. We maintained anonymity by using randomly assigned identification numbers for schools and teachers.

Analysis

An inductive analysis was used to find patterns of knowledge use. We developed and discussed preliminary categories through ongoing review of interview notes and tapes and tested them by classifying examples from the interviews. The boundaries of the categories shifted as overlapping ones were combined and new ones were created.

At the same time, we reviewed the literature for analytical frames that would aid the analysis. Shulman's (1986) sources of propositional knowledge provided the categories within which to present our findings: *disciplined empirical or philosophical inquiry, practical experience, and moral or ethical reasoning*.

In our analysis, disciplined inquiry included knowledge sources derived more or less directly from empirical studies. Most of the material that teachers read about teaching were reports of empirical research, reviews of research, or interpretations and applications of that research. We also assumed that materials covered in courses or workshops were research-based. We generally refer to this type of knowledge as *reading* or *research*. In addition, teachers' interviews contained many references to practical experience. Finally, we took ethical or moral reasoning to mean the values of justice, fairness, and equity that an individual or group of teachers holds.

These three categories are helpful analytical tools, but they are not as discrete as they may at first appear. Each of the categories influences the others, and sometimes the borders between them become blurred. For example, teachers' experiences are shaped by the empirically-based knowledge they receive in classes or inservice activities. This knowledge becomes part of the information base they rely on in making decisions. While teachers often contend that they make their decisions based on experience, it is usually experience combined with the theories to which they have been exposed during their training and professional development. Teachers' beliefs and values also color their interpretations of readings and experiences as do concerns about fairness and equity. With the interrelatedness of these categories in mind, we will demonstrate that teachers in this school renewal project combined different types of information from a variety of sources.

FINDINGS

We will look at the findings from two perspectives. First, we will examine how they relate to the forms of knowledge described by Shulman (1986), and then we will examine the ways they were combined to meet the teachers' needs.

Ethical Reasoning and the Values of Justice, Fairness, and Equity

Although it is difficult to cite specific references, this category seemed to support initial decisions to address issues. The clearest example comes from an elementary teacher who said that staff members wanted to modify their Young Writers Conference "because they wanted total participation of the kids." They renamed their conference and broadened their activities to include more students. Other examples demonstrating these values include a group that initiated activities to help at-risk high school students, and another that developed a program to extend positive reinforcement to a more diverse group of middle school students. The values of justice, fairness, and equity played a role in the selection of topics or the establishment of priorities, but it was not clear from the interviews what role they played as the teachers studied the topics and implemented changes.

Disciplined Empirical or Philosophical Inquiry

Reading

In 33 of the interviews, the respondents specifically discussed reading materials related to their topics. Of these, 23 comments were generally positive about the value of the reading, 4 were negative, 5 were neutral, and 1 respondent said that his group did not read anything. Some people who found readings helpful were able to use them as their primary source of information. other groups combined readings with other information. Some found reading useless or even counterproductive.

The teachers used reading in a variety of ways. First, a majority of the committees began their consideration of a topic by reading materials provided by the MIL office, site-based consultants, and committee members. This reading provided committees with background information and general ideas. In one school, teachers were trying to reorganize elementary reading instruction and student grouping. They found that reading helped them "jell" as a group and move beyond relying on "how they'd been operating for the last ten years. It was important for our staff to say, 'Wait a minute, we may think this is the right way, but all of a sudden there's all these studies that say it's a different way.' It was good for us." This group was able to use the readings as a springboard. Other groups, however, felt that the readings did not give them sufficient concrete detail to implement new ideas.

Another use of reading was to select and implement specific programs. One example is an elementary school faculty that wanted to try different ways of grouping students for instruction. Teachers read material in an MIL packet on grouping and selected the plan they thought

would work best in their setting. Other examples include a junior high school faculty that read about improving test scores and successfully implemented the ideas presented, two elementary school faculties that used materials on learning styles to improve instruction, and three schools, two elementaries and one junior high, that used research on the importance of parental involvement to begin programs.

Readings were also used because of their persuasive power. In another example of changing instructional groups, a middle school committee used research findings to convince the staff that heterogeneous grouping and peer tutoring would be effective. An elementary school used research demonstrating the importance of collegial interaction to support a proposal to the administration for a change in their planning time. An elementary school committee read about effective leadership for principals and, working with the building principal, set up an evaluation process for the principal For information, these groups all relied primarily on readings related to empirical studies.

Other Sources

In most cases, reading alone was not sufficient to find solutions. Some groups read materials they found helpful, but they needed to go to other sources of information to supplement the reading because the readings did not contain all the information needed for implementation. Other groups thought the material they read was of no value, and they had to go elsewhere to find useful information on their topics. These were generally cases in which teachers' experience was combined with research.

One example involved a high school that wanted to make better use of positive reinforcement in a school- wide rewards program. Faculty attributed the idea for the program to research, but they found that the readings did not give any specifics on how to proceed For this, they contacted teachers and administrators at other schools and then built their own program

Another example involved an elementary school committee which was revising the science curriculum. Although they could find general, background research on developmental levels, they found little research that would help them with objectives and activities. For these, they contacted other teachers district-wide, a regional science curriculum consultant, and the faculty of a local college. Next, they will pilot the science program they developed.

A third approach involved a middle school interested in student grouping. The committee began by surveying the staff. Based on those results, they read related research and presented their findings to the staff. From the staff's suggestions, they determined that more informa-

tion was needed. They deliberated among themselves, discussed the topic with their site-based consultant, and visited other sites before making their final decision.

In the examples above, teachers found research useful for identifying topics but lacking in the concrete details needed to implement programs in their classrooms. In four instances, respondents found nothing of value and were quite negative, at least about their initial readings. Elementary teachers looking into development of a school-wide discipline policy felt the material sent by MIL dealt was "too general, too much background " They eventually found other material that met their needs and developed a school constitution. Two other elementary schools were very dissatisfied with the material they received. One teacher whose committee was studying learning styles described the MIL material as "a pile of junk." The committee, with the help of their site-based consultant, found their own information. Another teacher, whose committee was studying discipline, described the MIL packet saying, "There wasn't anything really concrete to go from in that Mostly what came in the packet was theories and junk we've heard in college. It wasn't anything specific we could do." This group adopted a commercial discipline package. Finally, a junior high teacher whose group was studying the development of student's self-esteem felt some of the materials gave a false picture and thought this led to the discontinuation of the reading Her group relied on information gathered by a colleague who had been on sabbatical the previous year and other teachers' experiences. Although these teachers rejected the materials, it should be remembered that others found the same packets helpful.

Another source of information was people outside the school building whose jobs involved research. In a number of cases, teachers drew upon these people and their expertise. University faculty spoke to an elementary group about the role of literature in reading instruction. Another elementary group developed a joint project with a local college for team teaching science as part of a curriculum development project. People at one of the regional educational research and development labs provided information to an elementary school in which one group was considering parental involvement and another group was studying cross-level grouping of students for instruction. Additional sources of empirically-based information mentioned by teachers were private consultants, trainers for commercial programs, and inservice education.

Cases in Which Research Was Not Helpful

There were times when teachers found research was not helpful. These were related to the situation in which the research was being applied or

to the material itself. In the first instance, the teachers said the material was not appropriate for their grade level or did not fit their unique setting. A committee studying parental involvement found that, although research convinced them of the importance of parental involvement, most of the material was for elementary schools. Theirs was a junior high serving a low socioeconomic area.

In another instance, two schools studying motivation found the materials too general and not appropriate for their settings. They brainstormed solutions In a third instance, one school set up their own research project, with the help of their site-based consultant, when they found that the research did not meet their needs. They hope to eventually publish their findings on mathematics instruction for gray-area students.

Taken as a group, the schools of the MIL network are representative of schools across the country, so we would expect generalized research to apply, and it does. But problems do arise when individual, unique schools try to apply generalized findings to their particular situations. In most cases, schools in the project relied on teachers' experience to bridge the gap between generalizations and specific situations.

Experience

In many of the interviews, teachers mentioned relying on their own and others' experience when research materials were not sufficient, or in some cases, even before the research was consulted. This tendency by teachers to give validity to classroom and real life experience has been called *the wisdom of practice* by Buchmann (1986). It evolves from the notion that only those in the classroom can have a true understanding of the situation based on their knowledge of the school, students, and social norms of the community.

MIL has encouraged the use of practical wisdom in decision making through the interaction of staff members A substitute bank provides released time so faculties share and expand the wisdom of practice. In a number of interviews, the brainstorming and discussions that resulted because of this opportunity led to solutions for problems or improvements in instruction.

Surveys and Brainstorming

We found several examples of reliance on local experience A high school faculty that wanted to improve student motivation first read about the importance of rewards and reinforcements Then, they surveyed the staff, students, and parents to identify effective rewards, rein-

forcements that had worked in the past, and the accomplishments that should be rewarded. The result is a new reward program. Another high school group combined reading about the needs of at-risk students with their own experience to set up an adopt-a-student program. An elementary school committee decided they wanted to increase parental participation in their school. They began by looking at information from a regional educational lab and with this as a base, surveyed the staff several times to determine the types of things parents could do in the school. The group used these surveys to develop a parent volunteer program that provided over 2000 hours of service to the school last year. A second elementary school group wanted to improve communication between teachers and parents, especially parental involvement with homework. This group, as did the others, combined ideas from educational literature with their own experience to develop a program that was based on scholarship, but tailored to the needs of the school

Going Outside

In another set of examples, teachers reported going outside their buildings to draw upon experiences of a broader group of professionals by surveying or visiting other schools. This was often done in addition to surveying their own staff. For example, the K-12 school mentioned above asked schools around the state to send language arts curriculum guides. From these, they chose three to use as models for their own language arts curriculum development. In other instances, a high school asked for ideas about awards programs including types of awards other schools had found effective. As part of an effort to improve science instruction, an elementary committee surveyed the other schools in the district to determine the curriculum being taught, the problems they encountered, and ideas for improvement. An elementary school asked other schools in the district how they were increasing parental involvement, and a junior high school got information about improving test scores A middle school faculty asked for discipline plans from 10 other schools and, after receiving the information, visited the schools to see programs in action.

In another set of schools, teachers used visits as a way of gaining access to the accumulated wisdom of practice. Teachers thought it was helpful to spend time observing actual programs. An elementary committee visited another district school to observe instructional grouping while groups from a middle school observed peer tutoring and discipline. Teachers in still another school considered rearranging their planning time and, using time from the schools' MII substitute bank, visited two buildings that had the schedule they were considering.

Combining Experience with Other Knowledge

In some cases experience was combined with other types of knowledge to help teachers arrive at new knowledge. In a rural K-12 school with a large number of ESL students, a committee interested in improving language arts reviewed the district's policy and found no integrated program for language arts. As a first step in developing a program, they read information provided by MIL. The reading helped them break through the bounds of their experiences and exposed them to new ways of thinking about language instruction. They discussed these new ideas among themselves and with their site-based consultant who then provided them with additional information and training. Additionally, they collected language arts curricula from schools around the state and invited publishers' representatives to discuss how their materials would fit with the developing plan. Finally, they asked someone outside the district to review their plan to make sure nothing had been left out. In following these procedures, they combined a variety of knowledge sources to lead to a plan that met their needs.

In a final example of teachers' combining research and experience as part of professional development, an elementary school's movement toward conceptual instruction in mathematics began with one teacher attending a summer workshop on the *Math Their Way* program. She began using the program with her first-grade students. Soon the other first-grade teacher became interested and decided to take the workshop. During the second year, other teachers became interested, and the two were asked to do a workshop in the building. This led to the adoption of the program in the primary grades. This example differs from the previous one because, rather than dealing with an issue on a building-wide basis, it concerns a small group of teachers working on very personal concerns in their own classrooms.

CONCLUSIONS

When we began this study, our goal was to identify the sources of knowledge that teachers in MIL draw upon to make decisions about change in their schools. Through literature reviews we found analytical support for the premise that teachers draw information from a variety of sources (Buchmann 1986, Elbaz 1983, Shulman 1986). Through discussions and analysis of the data, we agreed that Shulman's three sources—empirical inquiry, practical wisdom, and ethical reasoning—described the sources of knowledge teachers were using. But as we continued with

the analysis, the distinction between empirical and practical began to take on the appearance of an artificial dichotomy and then began to break down. We decided that this view of teacher knowledge oversimplified the issue in problematic ways.

Our data indicate that teacher knowledge is complex and does not divide neatly into categories. It is comprised of all three forms of knowledge with one often informing another. For example, research-based decisions are colored by interpretation of the information. Conversely, teacher experience is informed by theory and research-based methods courses. We recognized that this would have some impact on our findings, but we did not anticipate teachers combining different types of knowledge to form a new knowledge.

This scholarship is a new understanding created by the interaction of empirical and practical knowledge. It is greater than the sum of the parts, and it provides teachers with the expertise to teach and to participate in their schools.

This knowledge has led some MIL teachers to expand their roles and begin seeing themselves as "experts" as well as teachers. These teachers are moving into new roles as the creators and transmitters of knowledge, not just to children, but to adults. For example, one faculty's parent involvement program was so successful they were asked to share it with other schools. Another teacher has gone to Russia to work with her school's consultant on a professional development program sponsored by the Soviet Union.

IMPLICATIONS

Because one of the authors is a teacher and the other is a researcher, we wrote two sets of implications, one from each perspective.

From the Public School Perspective

From the teacher's perspective, there are several implications that can be drawn from this study. First, teachers need to relearn the research skills they learned in college so they can use research as a source of information when making decisions about their classrooms and schools. Second, to make research more relevant, researchers should include topics of concern to teachers. To make research more understandable, researchers should use reporting formats that are more "user friendly." Finally, if research-based decision making is desirable, boards of education and unions should strive to include time for these activities in teachers' scheduled workdays.

As a teacher I have often been skeptical about the usefulness of research in making decisions about my classroom and my school. When I need information about a specific concern, I do not usually have time to run to the library or the expertise to wade through the research and sift out the information relevant to me. In my experience, research studies and their topics have been too far removed from the questions I have to be of any use to my particular needs. So as a source of information for me, research has been relevant primarily when I was working on my Masters and the 30 hours beyond it.

Involvement in MIL and this study has begun to change my attitude towards research as a knowledge source. I have begun to learn that, while experience is a necessary and in many cases a primary source of information when making decisions, other sources can interact to give the teacher a fuller, richer understanding of the problem. This understanding can then lead to a more thoughtful, better planned course of action. This is not to say that research can replace experiential knowledge; but rather, can enhance it. I have long contended that teachers unconsciously use empirical knowledge to enhance experiential knowledge. You do not check what you previously learned at the door when you walk in and teach. Perhaps what we need is to work actively toward consciously including research in our decision-making process so we can continue to learn as we teach our students to learn.

To encourage this trend, researchers and research institutions should take teachers' needs into consideration when determining what to study and how to report it. As a teacher, I realize researchers are bound by rules and conventions that are not readily apparent to the layperson. However, if research is to influence education, especially practitioners, they need to make it more applicable to the lives of teachers working daily with students. One positive trend in this direction is the increasing tendency to use qualitative rather than quantitative methods. This development may lead to a less rigid format that is more easily understood by practitioners.

Finally, if teachers are to become decision makers who base their decisions on the thoughtful consideration of a number of information sources, then they must have time to do this adequately. As a teacher, I can tell you that there is not enough time in the scheduled school day now to complete the tasks required. As teachers in the MIL network, we have had the luxury of using released time to consult other sources of knowledge when making decisions about our schools. But this should not be a luxury! If thoughtful consideration of options is important, time for such consideration must be provided. Teachers should not be expected to continually "donate" their time. Together, the boards of education and unions should strive to negotiate this time.

From the University Perspective

There are implications here for the nature of the research we do and for the ways in which we present this research to practitioners.

Researchers seem to be covering topics of interest, because MIL teachers were able to find materials on most of the topics they identified. But they had to look further for specifics of implementation. The university research community could work more closely with classroom teachers. I am not suggesting we surrender our research agenda to classroom teachers, but we could do a better job of incorporating their concerns and perspective into the planning, execution, and reporting of our research. One way of accomplishing this is through the establishment of more university-school linkages: not just going out into the community to find a research site, but bringing classroom teachers on to the research team as fully participating members.

I do not believe that it is the university researcher's responsibility to answer all the teachers' questions. In this study, we found teachers combining empirical information with their experience to create new knowledge and understandings about their classrooms. Because the researchers have access primarily to one of these, the empirical information, they cannot provide all the information a teacher needs to implement a classroom change. But, we could do more towards identifying teachers' questions and addressing them in ways that teachers find meaningful

As a teacher of research courses for graduate students, I have often thought about the need for a bridge between the research community and practitioners. I see the construction of this bridge as essentially a university responsibility. Once built, however, its maintenance would require investment by both communities

MIL has placed a consultant in each of the participating schools to assist teachers with the tasks of finding, interpreting, and applying research. As schools mature in the project, the amount of time the consultant spends in the school often decreases, and teachers take over research utilization In many cases the consultant has formally or informally taught the teachers how to use research to meet their needs.

There are other ways of bridging this gap between universities and schools. Within existing university courses, the role of research can be changed, as can the image of the teacher's relationship to research. We can teach people that research is one--and only one - source of information for decision making about schools. Research should be put on a par with experience, values, and other types of knowledge about schools rather than being given privileged status. We should help people develop the ability to draw upon research and combine it with other forms of knowledge to develop new understandings of life in schools.

This teaching should take place within structures different from what we commonly see. The linkages between schools and universities should extend beyond the research interests mentioned earlier and should include relationships between university and school faculty that are more collegial and less hierarchical. One way of doing this would be minimizing the number of formal courses in which university faculty are the sole providers of information and teachers are viewed in traditional student roles. If empirically-based knowledge is on a par with experience, university courses would involve a more open exchange of information between peers who have expertise in different, but equally valued, areas. The responsibility for providing forums for these new classes should be spread beyond universities and should include local school districts and professional organizations.

Finally, for this new knowledge to develop, the job of teaching has to change. We have given examples of teachers who are spending part of their time doing work that has been heretofore the exclusive domain of university faculty and private consultants. If this is part of the professionalization of teaching, and I believe it is, we need to provide the time and support teachers need to pursue these activities. The job of teaching has to be seen as more than just working with students using techniques prescribed by researchers to deliver a curriculum developed by specialists under conditions dictated by administrators. Time has to be provided for teachers to read, reflect, discuss, create, and share various types of knowledge for the renewal of schools.

DISCUSSION QUESTIONS

1. What sources of information did teachers use to make decisions?
2. What problems occurred in using the information?
3. What role did teachers' experience play in knowledge utilization?
4. What does the importance of teacher experience imply for the research-practice relationship?
5. Relate this to your own experience with decision making.

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7. MESSAGES FROM TEACHERS TO RESEARCHERS

by Charlie J. Jaquez, Jr.

The messages that teachers involved in knowledge-based school reform have for researchers were investigated. Twenty-six schools were queried by means of a computer network. Half of the schools responded. The messages from teachers to researchers included: solicit research articles from practitioners, tone down the jargon of research articles, and treat teachers as peers.

In October of 1988, MIL and IBM entered into an agreement enabling the 26 MIL schools plus 30 additional sites to form a computer network using telecommunications software called PSInet (People Sharing Information Network). Among the needs met by the PSInet linkup are: providing easily accessible state-of-the-art information about school renewal, restructuring, and school improvement priorities, communicating with regional labs and research universities, enabling practitioner sharing and discussion of research applications, and linking MIL with other school reform projects.

PURPOSE OF THE STUDY

The purpose of this study was to determine whether teachers involved in school reform projects had messages directed toward the educational research community and to determine the substance of these messages.

A secondary objective of the study was to determine the effectiveness of obtaining research data by using a telecommunications network among the MIL sites.

DESCRIPTION OF THE SAMPLE

The respondents were teachers who have been involved in MIL for a period averaging about three years. Of the 26 MIL sites, teachers from 13 schools submitted responses to the questions. Two consultants responded as well, and while their comments were not tabulated, they were considered in the conclusions.

The sample included one urban site, four suburban, four rural, and four sites of unspecified demographics. Of the 13 sites, five were elemen-

tary schools, two were middle schools, two were junior highs, two were high schools, and two had combined elementary/secondary enrollments. The ethnic demographics varied from 68 to 97 percent Caucasian and from three to 32 percent minority, however, one school was 95 percent Hispanic and five percent Caucasian. The schools were located in Arizona, California, Colorado, Florida, Georgia, Iowa, Michigan, Minnesota, North Carolina, Tennessee, and Virginia.

METHOD

The study was conducted over a 60-day period, using the telecommunications network to collect the data. The following questions were sent to each MIL workstation:

1. How has educational research affected your school improvement project?
2. Has your school been involved in a research project within the last five years? If so, what was the outcome?
3. Do you find that time constraints during the school year hinder your ability to keep abreast of articles?
4. Do you have good access to educational research and if so, how do you obtain research articles?
5. How could the research have been more useful?
6. Do you believe that integrating research and practice could benefit school improvement?
7. Do you find the jargon of research articles cumbersome?
8. What message(s) do you have for the research community?

Responses to the questions varied in degree of detail and form of transmission. In all but two instances, responses were sent via the telecommunications network

PROBLEMS

The major problem affecting the study was that the computer network was in its infancy. The network had been increasing its number of operating workstations since November 1988, but not all MIL sites had "logged on." In addition, the users had not yet developed a cadre of teachers at each site to participate in the computer network. An advanced feature of the software, using "forms" for gathering data, was not employed because the users were still experiencing discomfort with that feature. More time to gain experience and develop confidence with the computer network would have increased the response rate.

A search of ERIC through the DIALOG Information Retrieval Service was not particularly fruitful. Terms such as "school improvement projects" or "teacher-researcher dialog" did not exist. "Educational research," "educational improvement," and "teacher attitudes" yielded only a small number of articles containing messages to researchers from teachers.

MAJOR FINDINGS

First, teachers in 54 percent of the sites responded that educational research had a positive impact on their school reform projects. Educational research "has been the backbone of our project," wrote one respondent. Thirty-one percent of the respondents stated that research was used to "structure goals" or "lend direction to projects," while 15 percent used research to "support our decisions." Teachers at one school responded that they used research to "form a discipline policy and developmental teaching." Another respondent recommended that sites "use action research for making improvements," while another wrote that research has been used "but less utilized the past year or so." The use of research caused the faculty at one site "to re-think some basic principles or approaches." At one site, respondents reported that research has had little effect on their project.

Second, teachers in three of the schools responding have been involved in conducting research projects within the past five years. One had been involved with data gathering on cooperative learning and learning styles, while another studied the development of collegiality through the use of research. At one site, faculty were in the process of determining how the mastery method of teaching mathematics compares with the traditional method when teaching students who are not achieving at expected ability levels and are not receiving any special services.

Third, 85 percent of the teachers responded that time constraints during the school year prevented them from keeping abreast of research articles and 23 percent of the respondents characterized it as a major problem. Having the time to go to a library and conduct a literature search was "almost unheard of." One respondent felt that the designation of time to read research materials and formulate ideas for implementation could be very useful. Another faculty developed study groups to discuss articles, but they met with limited success because of the lack of time available for this activity. A teacher at another site wrote, "We did take some release time to read research but have not done so recently."

Fourth, access to educational research was not a problem for 85 percent of the respondents. The remaining 15 percent felt that their access to research was getting better and was less "haphazard."

The two most favored sources of research material were MIL's TRaK (Teaching Resources and Knowledge) data base and the site-based consultant These sources were listed by 38 percent of the respondents. ERIC and the computer network were listed by 31 percent of the respondents, and 23 percent of the respondents cited local education agencies or regional labs. College libraries, school libraries Phi Delta Kappa booklets, and professional meetings were listed by 15 percent of the respondents. One site's library subscribed to 23 professional journals and had access to ERIC through the DIALOG Information Retrieval Service. Teachers at another school worked with a nearby university and had access to ERIC within the district.

Fifth, there was limited agreement on how research used within the schools could have been more helpful. Responses ranged from dealing with the inaccessibility of research materials at the public school level, to disagreement about whether educational research should be more general in nature or more directed toward particular problems Twenty-three percent of the respondents wanted educational research to be "more directly tied to classroom practice" or directed to the "day-to-day practical needs of teachers."

Concern resurfaced about the lack of time available to read and compare research studies Twenty-three percent of the respondents felt that inservice or classes dealing with how to read and interpret research articles more effectively would minimize "wasted time." These respondents felt that such classes would have made them feel more confident sooner. One respondent suggested the establishment of an "on-line clearinghouse accessible from public school buildings whereby, after requesting information on a topic, a choice of options would be presented and then you could choose to have the articles or citations transmitted electronically immediately to school."

Sixth, teachers unanimously agreed that integrating research and practice would benefit school reform. One respondent wrote, "The whole point of MIL is that what we're doing just can't afford to be happenstance. It must be based on what's best for the total child, not just the intellectual side." Another respondent wrote, "There needs to be recognition that many experiments fail in early attempts before the final success is achieved."

Seventh, a majority of respondents (54 percent) felt that the jargon of research articles was cumbersome. Fifteen percent of the respondents disagreed, and 8 percent felt that research jargon was only sometimes cumbersome One teacher remarked, tongue-in-cheek, that researchers should "eschew obfuscation." Statistical data were a particular stumbling block in reading research articles Thirty one percent of the respondents characterized the length of some research articles as cumbersome.

One respondent wondered if there exists "a service somewhere that rewrites some of the good research into more meaningful language." However, another teacher felt that "the more one reads research, the more comfortable one becomes."

Eighth, responses to the question, "What message(s) do you have for the research community?" were by far the most negative. For example, 15 percent of the respondents made disapproving comments about the "ivory tower" approach to research. Fifty-four percent of the respondents felt that research topics often did not relate to the "real world," that is, daily classroom life. A suggestion was made that the research community treat teachers as peers. It was further suggested that research projects be started by going into schools and talking with teachers, administrators, students, and parents, rather than developing an abstract project which then maybe gets tried in a school. Fifteen percent of the respondents recommended that the research community "solicit articles from practitioners."

With regard to the relevance of research, one teacher wrote, "Please relate research more to classrooms that seem like 'real life' to me. Translate statistics into meaningful phrases." Another wrote, "Eliminate much of the jargon and be more concise in what the findings are."

CONCLUSIONS

In the field of education, it is questionable whether the functions performed by teachers and educational researchers are intimately interrelated. A polarization seems to exist between educational researchers and teachers.

Teachers respect and value the findings of educational researchers, but are sometimes dissatisfied with the scope and jargon of research. Terms such as "haptic perception," "parallelism of regression planes," and "varimax rotated factor matrix," can be perplexing to the practitioner in the classroom.

Casanova (1989) suggests that practicing educators and researchers bring different perspectives to the problem. These differences must be recognized and deliberately addressed in any efforts directed at integrating research and practice in education.

Teachers agree that educational research is important and can have a positive impact on school reform; that educational research provides a very good basis for making educational decisions. Among MIL sites, teachers are satisfied with their access to research, but find that time constraints make it difficult to devote sufficient quality time to the reading of that research.

The main messages to the research community from teachers involved

in MIL's school reform projects are. solicit research articles from practitioners; tone down the jargon of research articles, and treat teachers as peers.

DISCUSSION QUESTIONS

1. What was the research question in this study? What was the study's design?
2. What messages emerged from the study?
3. How can teachers and researchers begin to close the gap that exists between them?
4. Are the different perceptions between teachers and researchers simply a matter of awareness or are the differences more profound?
5. How could researchers include input from students, teachers, administrators, and community members? Should they seek such a wide array of input? Is it necessary that teachers and researchers work closely?
6. Can and should the jargon of research be toned down?

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8. KNOWLEDGE, POWER, PROFESSIONALISM, AND HUMAN AGENCY

by Charles L. Thompson

This chapter provides a researcher's response to the previous chapters. Knowledge invests those who acquire it with power. Power (as the root of empowerment) relates to enablement, psychological authorization, capability, and rights. Teachers become active agents as they question and think. They multiply knowledge and their power to educate. As a result, they change the institutions in which they work. Teachers have minds, and therefore research is used to reconsider practice rather than dictate practice. As teachers deliberate over good practice, their roles change as do the roles of administrators, central office personnel, and the union. This book illustrates a larger issue that teachers—and all of us—can transform the institutions that shape our lives.

The Symposium from which the chapters in this book were derived was remarkable for reasons that have thus far gone unremarked. It was a session at the major organization of educational researchers in America, organized by the major organization of teachers in America, about the use of educational research by teachers, in which the central claim was that research and related new knowledge can empower teachers rather than oppress them.

Further, the "power" in "empowerment" has to do mostly with enablement and psychological authorization rather than with power in some narrowly political sense. The authors of these chapters, largely teachers and people who represent teachers, claim that research-based knowledge can enable teachers to do their jobs more effectively and that it can give them a sense that they have a right to interpret situations and make decisions in their schools as well as in their classrooms.

True, the Mastery In Learning Project does involve the creation of building-level councils or committees that are dominated by teachers. And these formal structures do legitimize a more powerful role for teachers in building-level decision making. But that is not the primary point. The primary point is about knowledge and power, that knowledge invests those who trouble to acquire it with power, with the sense that they have both the capability and the right to make large decisions about the education of the children in their care. As a by-product of making these

decisions, they also can and may shape the institutions in which they lead their professional lives—not merely be shaped by them.

In his AERA Division G Vice-Presidential address, Fred Erickson spoke—with his usual alternation between close examination of small social interactions and large points about our relationships with societal institutions—about "Structure and Agency in Education, Culture, and Society."

By "structure" I think he was referring to those patterns in our behavior—norms, values, ideas, and expectations for each other—that shape what we do, those patterns that amount almost to computer programs onto which we fall back by default when confronted with an incredible array of small decisions in our lives, personal and professional. There is a certain choreography to our days, and it would be unthinkably difficult to get through them without accepting some pre-programmed, socially prescribed patterns. Keep to the right in traffic, stop at red lights, report to school on time, read from left to right and down the page, get the kids' attention before giving directions, cover all the material before giving the chapter test.

But relying on socially-given structure continually, day in and day out, becomes a form of sleepwalking. Before long, we are no longer conscious of making any decisions about driving, reading, or even about teaching. We enact familiar patterns out of some combination of habit and deference to authority. Decisions are made, but we are not sure who is making them. Perhaps the principal, perhaps the superintendent, perhaps the board, perhaps the state department bureaucrats, or maybe the federal bureaucrats, or is it the publishers and the big testing companies?

Decisions are made in the passive voice, not our voices. The sense of human agency is lost. Who is acting? Well, the people who wrote the chapters in this book have rediscovered a sense of their own agency, a sense that they can originate action as well as be the object of it, a sense that they can shape old structures and make new ones. They know, as Erickson knows, that they are not radically free to act, to do whatever suits them. They cannot abolish school, or throw out mathematics, or eliminate testing, or do away with all forms of grouping.

But they are free to question, to think, to revise the basis for grouping, to change their approach to instruction in reading and writing. And in so doing, they not only change the educational program for students, but they also transform their relationships to the organizations in which they lead their professional lives. They awaken from a sleepwalking acceptance of established patterns of all sorts, and they know the exhilaration of taking control.

The revolutions reported in this book are not, however, simple redistributions of power. These revolutions do not so much redistribute power

as multiply it. New knowledge, the authors report, emboldens teachers to think, to examine their practice, to believe that they are competent to change existing practice. And there is an almost electric sense of energy release that accompanies this realization, a sense of excitement that raises the energy level throughout each building.

The adage that power is not a zero-sum game—that nostrum of the organization development people—has always seemed an empty piety to me. A nice sentiment, one that legitimizes the participatory forms of management that I would like to see legitimized, but somehow too good to be true. Something like table-top fusion. But the chapters in this book illustrate the sense in which the OD adage, despite its Pollyanna quality, can in fact be true. As the teachers in these accounts become convinced that from new knowledge they derive the capacity to change old practice, they also begin to believe that they have a right to change that practice, and the sense of competence and authorization releases new energy. As a consequence, power—power to educate—is multiplied rather than divided. One senses that the principals in these buildings have little to lose and much to gain as the number of people who take responsibility for the school's success rises.

I am quick to concede that exhilaration was not the only byproduct of these encounters with research. In fact, frustration with the real or apparent conflicts among studies on a topic such as grouping threatened to destroy some of the projects represented here. And even when a synthesis of the research on grouping resolved the conflicts, unalloyed enthusiasm was not the immediate response. On the contrary, in one school Jeannie Oakes' synthesis set off a painful reappraisal of grouping practices, a reappraisal that went underground for a time as teachers denied the validity of the research but surfaced powerfully as they conceded its accuracy and faced the prospect of deep changes in their classrooms and throughout the school.

Nevertheless, the teachers in these projects did in fact feel empowered by their experiences with research. Why is this? It certainly has not always been so. In fact, the complaints voiced here, in passing, about research that is inaccessible, contradictory or equivocal, obscurely written, fine in theory but impossible to practice, or irrelevant to the real problems of practice have traditionally been the primary rather than the secondary responses of practitioners to educational research.

Over the past twenty-five years, a series of different federal programs have sought to make research more accessible, have synthesized it and translated it into language and formats more congenial to practitioners, have tried to focus it on enduring problems of practice, and have provided in-person support to practicing educators in defining problems, searching for solutions, choosing among them, learning to implement

innovations, debugging them, and making them part of the enduring institutional structures that shape practitioners' lives.

As a result, by the beginning of the 1980's, experience and research on dissemination and knowledge utilization had revealed a great deal about the adoption and implementation of well-defined educational innovations. Some of the experience reported in this volume parallels and repeats that earlier experience. It confirms, for example, the importance of "knowledge synthesis"—the distillation of multiple studies into a coherent set of findings and interpretations, written in English. It also tends to bear out the value of some reasonably systematic process of problem framing and consideration of alternative solutions, carried out by a group representative enough to establish a sense of "ownership" over whatever steps are taken to address the consensually-defined problems.

But there is something new here, something not at all prominent in earlier research on the diffusion and adoption of innovations the belief that *teachers have minds*. The decade of the eighties appears to be the decade of mind. The idea that we do not merely behave but actually have minds has become intellectually respectable again.

It was children who were first discovered to have minds Inspired in part by Piagetian studies of individual children's thinking (though not sharing Piaget's ideas about their ineluctable evolution through stages of thought), in the middle to late seventies American psychologists began to study quite closely what children actually think as they encounter specific subject matter domains. By the early eighties, in a flight of stunning inference, psychologists saw that if children have minds, adults probably do, as well—even those adults who are teachers.

The authors of these chapters seem to take it for granted that teachers have minds, perhaps because many of them are themselves teachers. It is as though, in the *Wizard of Oz*, the Scarecrow knew all along that he had a mind, while the Wizard came late to this conclusion. Well, the Wizards of Research now know that teachers have minds, and teachers are pretty confident of that, as well.

A consequence of this discovery is that, now that we have minds, we can think differently about the use of research. In their conceptual framework for this session, Carol Livingston and Shari Castle spelled out a range of senses in which teachers may be thought to use research. In addition to the traditional, mechanistic "application" of research and the use of research to justify decisions made for whatever reasons, Livingston and Castle point out that the teachers appearing in these chapters use research as a basis for contemplation and deliberation about current practices and problems Research is used to inform a thoughtful reconsideration of practice, not to dictate or direct behavior as is the case in

the "application" mode.

Sometimes, they add, this deliberation leads teachers to transform the whole way they think about some issue of practice. Teachers may use research not merely to add specific student grouping techniques to their repertoires, but may abandon the practice of homogeneous grouping entirely, shifting to heterogeneous grouping practices for reasons of both equity and instructional effectiveness. An evident logical implication of the assertion that teachers have minds is that they can change their minds Taking matters a step farther, Livingston and Castle see teachers actually collaborating in the production of research. This may prove unnerving to the Wizard, but it seems to be exhilarating to the Scarecrows.

These notions about modes of research use fit nicely with our changing images of teachers and of the nature of expertise in teaching. Livingston and Castle sketch three different images of teachers, considering teachers in turn as technicians, artists, and professional decision makers. They note the match between the image of the teacher as a technician, carrying out prescribed procedures within a heavily constrained bureaucratic environment, and the traditional conception of research use as the straightforward application of truths discovered by others. By contrast, to the teacher as artist, research is entirely irrelevant.

While not denying that teaching has its artistic dimensions, nor denying that technique has its place, Livingston and Castle argue for the image of the teacher as a professional decision maker, deliberating over problems of practice in light of research and theory as well as prior experience. In "Inexact Sciences," a paper that has just received AERA's award for the best literature review of the year, Mary Kennedy examines four different conceptions of the nature of expertise in teaching. Kennedy points out weaknesses in all of these conceptions, but seems most persuaded by a conception of teaching expertise as "deliberate action," meaning something quite close to Schon's "reflective practice."

In all, then, the case descriptions in the present collection appear quite consistent with the emerging consensus on the teacher as a professional decision maker, using research and other new knowledge as a basis for deliberation on practice, where the very definition of expert practice features deliberation on ends and means in teaching as a central characteristic.

As teachers deliberate over good teaching practice, they are—almost as a byproduct of their deliberations—also changing the nature of the school as an organization. For one thing, teachers' roles are expanding beyond the classroom to include participation in the interpretation and resolution of school-wide problems. This, in turn, changes the nature of their relationship with the principal and other administrators in the building. They are becoming colleagues rather than subordinates. Nor

do the changes stop there. A school building in which teachers feel empowered to work with their principal to make organizational as well as instructional changes will inevitably disturb traditional relationships with the central office, as well

One of the most interesting organizational impacts of the Mastery In Learning Project is likely to be on the union itself. As the union becomes a vehicle for dealing with instructional and instruction-related organizational issues, and as these issues are addressed through collaborative deliberation and problem solving, adversarial labor-management relationships may be expected to give way to cooperative professional modes. So that in changing classrooms and schools, the union also begins to change itself as an organization.

I am reminded here of a recent paper by David Cohen, entitled "Teaching Practice: Plus Ça Change. . ." In attempting to account for the pace of change in teaching practice, Cohen refers to a "long, slow collision" between traditional ideas about teaching and learning and new ideas emphasizing exploration, inquiry, and dialogue—what he calls "adventurous teaching." Cohen emphasizes that traditional ideas about teaching—that teaching is telling, that knowledge is facts, and that learning is accumulation—are deeply embedded in family, church, and community experiences with teaching, not to mention the long apprenticeship in teaching that each of us undergoes as she/he is coming up through school. Because these ideas about teaching are so deeply embedded in our social institutions, they are also deeply embedded in our psyches. They are there at the level of tacit assumptions, as schemas, or patterns that shape our behavior unconsciously.

So, we return to the interplay of structure and agency as Fred Erickson put the matter. What we are seeing in these chapters, and in many other contexts throughout the education profession these days, is a "long, slow collision" between ideas about social organization that emphasize structures that constrain and shape our behavior against our will and the idea that social structures are our own creation, with the corollary that if "we" created them, we can change them. The latter is, of course, a notion that goes back at least to the Renaissance, when it was given its clearest expression by the humanist scholar Pico della Mirandola. It is a notion that has resurfaced in various constructive or destructive forms ever since, from the American and French revolutions to the Russian and Chinese revolutions whose institutional byproducts are beginning to undergo their own restructurings

Each revisitation of this theme—that we are free to recreate the institutions that shape our lives—is a part of that long, slow collision of ideas about social structure and agency That includes the present restructuring movement in American education For me, this long historical perspec-

tive is both depressing and ennobling. Depressing, because it is obvious that major attempts at change have been frustrated or have gone awry far more often than they have succeeded in achieving their stated ends. In fact, they have frequently produced results diametrically opposed to their espoused goals But the long historical perspective is also ennobling, because it suggests that initiatives like the NEA's Mastery In Learning Project are not only about the improvement of teaching and learning, or only about the building of new kinds of schools, or even about the elevation of education to the status of a true profession, but also about the transformation of the relationship between us and our institutions—about the enlargement of human agency

DISCUSSION QUESTIONS

1 What does the author mean by empowerment, structure, agency?
2 How do knowledge and power interrelate? Structure and agency? How do these interrelationships work to transform teachers and schools?
3 Discuss the following notions and their implications. teachers have minds, we are free to re-create the institutions in which we live, through knowledge the power to educate is multiplied rather than divided or redistributed
4 Compare the author's response to the previous chapters with your own response

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9. PRACTICING THEORY: TEACHERS USING AND CREATING KNOWLEDGE

by Jay Sugarman

This chapter provides a teacher's response to the first seven chapters, considering each in the framework described in Chapter 1. Questioning one's practice not only leads to professional development, it enables the act of teaching itself to add to the knowledge base. Formal research is just one piece of data for informed decision making. Teachers need support and resources for the life-long learning, critical thinking, and reflection expected from professionals. Interaction, discussion, and collaboration between teachers and researchers are crucial.

When I received the set of papers which now comprise the chapters in this book, my first reaction was how much being a respondent at the AERA symposium would be like my usual job as an elementary school teacher. In both cases, I would have seven things to cover and about twelve minutes to do it. Since I did not have to deal with anyone in the audience leaving for remedial reading or band practice, and I did not see a public address system to provide any additional distractions, I thought I would be able to cover all the papers within the time limit. I wished I could be as efficient in the classroom.

After reading through the various papers for the first time, I was really quite excited about the work these schools had been doing and impressed with what the respective faculties had accomplished. When it came time for me to organize my thoughts and reactions in order to comment about these efforts, I thought back to one of Jimmy Nations' observations. It was not until his staff at the Westwood School discovered John Goodlad's framework for clarifying issues related to grouping that they began to make some progress. Jimmy hypothesizes:

> ...teachers find the results of individual, isolated studies confusing and nonproductive, but they welcome research findings presented within a comprehensive framework as substantive input to the decision-making process

This is why I found Carol Livingston and Shari Castle's essay so helpful. It provided me with a framework with which to understand the work of the different schools in the MIL Project.

Recognizing that their five conceptions about what it means to "use the knowledge base" in decision making are neither exhaustive nor mutually exclusive, I decided to view the different projects through these lenses. The five uses they refer to are application, justification, contemplation/deliberation, transformation, and production. I also want to highlight what I see as some of the key factors that have contributed to the development and current successes of these school-based reform efforts. I will then share some thoughts about what this might mean for future reform efforts and the use of research literature by teachers.

The first thing that struck me about Jimmy Nations and his colleagues at Westwood School was the sense of unity that existed at the school before they joined MIL. Here was a school that had an excellent record of achievement, good test scores, high staff morale, and strong parental and community support—yet they still felt the need, and had the desire, to improve. Their sense of purpose says a lot in its own right. The faculty's initial concerns about student behavior in the hallways, bathrooms, and lunchroom reminded me all too well of the realities of school life.

Jimmy's remarks about how the Grouping Committee went about reading, discussing, and analyzing the research clearly depicts a faculty that values contemplation and deliberation. The validation they received from the literature provided these teachers with the courage to challenge regularities—in this case, the inappropriate homogeneous grouping of second-grade students for the major part of their school day. Further reading and discussion provided the necessary validation they needed to present their findings to their colleagues and the school community.

The only point I take some exception to is Jimmy's statement: "Whether or not these findings apply to all teachers is a question for the researchers." In the spirit of contemplation and deliberation as well as more collaborative efforts between teachers and researchers, I would add that it is a question for other teachers, as well, and not just for the researchers. Because several other contributors have mentioned the collaborative efforts of teachers and researchers, I will return to that topic later in my comments.

One final note about Jimmy's chapter. When I finished reading it, I was left feeling very curious about what happens to the second-grade students when they leave Westwood and go to a third grade somewhere else. How is the matter of grouping handled in the new school?

To me, the most exciting aspect of Aire Libre Elementary School's description by Patricia Schaefer was the hands-on approach they have taken to the study and application of research. This approach to instructing and working with teachers models what we, as classroom teachers, hope to accomplish with our students: not only to provide them with information, but to convey it in a meaningful manner and, whenever possible,

to connect what we study in the classroom to the real world.

Their study of mastery teaching compared with traditional teaching is a clear case of the use of research for the purpose of production. These are practitioners who are researchers themselves. They are concerned with providing the best education they can to their students. In addition, they are growing as professionals and adding to the knowledge base of the profession.

I hope their hypotheses are indeed validated, and I will eagerly await the upcoming analysis. One question that came to my mind was whether the teachers whose classrooms were used for the study knew who the gray-area students were and, if they felt they treated those students differently from the rest of the class. It was not clear from reading the chapter whether this was the case.

Unlike these first two cases, where changes seemed to be incorporated rather quickly and with the strong support of both faculties, Sue Walters' report about Wells Junior High School and Nel Ward's discussion of Maryvale High School were examples where changes did not proceed as smoothly or as predictably.

At Wells Junior High School, the issue of ability grouping was again of prime concern. However, as the situation developed, this initial concern branched out primarily into two related matters. 1) equity; and 2) instructional methods. Wells provides an example of transformation: viewing a situation in a new way, framing problems differently, and changing one's perception of "the problem."

The Wells faculty's proposal to provide richer educational experiences came out of the equity issue raised in the research on ability grouping. The subsequent inservice offerings on instructional strategies were another instance of transformation. That the staff continued to read and weigh the evidence from the research literature shows how they used the literature for contemplation and deliberation. Teachers began questioning their own practice and the norms of schooling. In the end, the research literature validated their recommendations about grouping.

The Grouping Committee's decision not to impose changes immediately, even though they thought it would be best for the school, should serve as an example of how different interest groups can work with classroom teachers. Basically, teachers' experiences have to be taken seriously; and teachers need to be consulted before groups such as business, government, or even their own school administrations make recommendations concerning teachers and the ways that they work with students. Not only must teachers be involved in the decision-making process, but they also need training if they are to implement lasting change.

At the end of the paper, Susan states, "The process of using the knowledge base to question practice is at the heart of professional devel-

opment." I'd like to add that by questioning one's practice and our classroom experiences as teachers, teaching itself can, in turn, add to the profession's knowledge base. I think it is important to emphasize the collaborative nature of building the knowledge base between teachers and researchers.

Nel Ward begins her chapter by recounting the long-standing problem of teacher isolation. It is no wonder teachers have seldom connected with researchers; it is hard enough to talk to someone in the next classroom, much less someone a number of miles away.

However, after exploring the research literature together with the MIL support system, teachers at Maryvale are no longer speaking solely with members of their own department The efforts of these teachers indicate not only how a school can improve collegiality among teachers, but how collaboration between researchers and practitioners can be supported and improved.

Nel reports a decrease in "kid-bashing" in the faculty room. This bonus provides additional support for teachers' opportunities to read and analyze the research literature. The exposure to these publications has not only improved collegiality and added to the teachers' personal knowledge bases, but, in the end, their students have also gained. That students prosper as a result of teachers' studying and applying the research literature was of prime concern in the other chapters as well.

Finally, I was intrigued by Nel's account of *Updates*, the research summaries written by a member of the staff and distributed regularly to the faculty Whose idea was this? How did it work? How can I get on the mailing list?

Charlie Jaquez' finding that teachers lack time to do literature searches or to read the research literature is not surprising. It is ironic that, in a profession committed to encouraging life-long learning, critical thinking and reflection, teachers—the main providers of these services—are not supported in this manner. It made me think that, as many schools have SSR time for children (Sustained Silent Reading), maybe we can try to incorporate SSRR (Sustained Silent Research Reading) for teachers.

Charlie also reports that teachers would like to see the jargon used to report educational research toned down. While more "user-friendly" language might be helpful (as Joanne Schnesk also suggests), we need to be careful so that "translation" does not become a dumbed-down version (the way children's literature is treated in some basal anthologies). If this occurred, no one's interests would be served, and the gap between researchers and practitioners would probably grow.

One of the encouraging results of Charlie's study was teachers' desire to become involved in the production of the research literature. This interest serves as a reminder, an invitation to educational researchers, that

teachers not only value the use of research, they want to collaborate with the research community in developing the knowledge base of the profession. These chapters show us that we do not need to have a West Side Story mentality—the Jets versus the Sharks, us versus them, practitioners versus researchers.

One way an organization like the American Educational Research Association can promote teachers' participation and voice in research would be by creating a Special Interest Group (SIG) that is sensitive to, committed to, and respectful of teachers as researchers and of the collaboration between teachers and researchers. During the AERA meeting, I encountered several other teachers and researchers who thought this SIG might be valuable. We held an initial meeting, and the SIG is off the ground, tentatively entitled *Teachers' Voices*.

In co-authoring their chapter, Joanne Schnesk, a classroom teacher, and Gary Rackliffe, a university researcher, model the type of collaborative efforts to which we have been referring. One of my first concerns about MIL was that it might promote research as the ultimate source of information for teachers to use in school reform efforts. This study allayed my concern by highlighting the other sources (such as school visits, teachers' exchanges, courses, workshops, and so on), then going a step further to validate their use in school reform efforts. We need to remember that research is just one source of information for decision making. Jimmy Nations makes this point in his chapter, and Joanne and Gary substantiate it.

While reading the research literature is a step in the right direction, face-to-face interactions between teachers and researchers, discussion, and collaboration are crucial for the most complete development of the knowledge base. In order to achieve these ends, we need to incorporate Joanne and Gary's recommendations: administrative support, time, university-school linkages, and research skills as an integral part of teacher education programs.

SOME CLOSING POINTS

In addition to demonstrating how each group has used research, the descriptive case study approach employed in several of the chapters provides a very promising method for future collaborative efforts between teachers and researchers.

What I find most impressive about MIL is the support it provides teachers throughout their school-based reform efforts. The Project staff and participants recognize that the scarcest resource a teacher has is time. Their efforts in organizing information, disseminating it efficiently, providing released time, providing site-based consultants, and encouraging

support from regional laboratories, centers, and universities are regarded as crucial to the success of the respective programs.

If, as Carol Livingston and Shari Castle have suggested, the ideal MIL teacher is a responsible, informed, collegial, and professional decision maker, then the teachers who wrote the chapters in this book, as well as those who worked on the various projects reported herein, are indeed true representatives of this ideal.

I would like to end by saying that this book and the work being done by MIL epitomize the interdependence of research and practice. I think it would benefit both teachers and researchers to build upon these efforts and to make this sort of collaboration so commonplace that we do not need a special book to be reminded of its importance.

DISCUSSION QUESTIONS

1. How does the author apply the Chapter 1 framework to the other chapters? What does he discover about the respective chapters?
2. What are the key factors needed for development of the knowledge base and its use in school reform?
3. How does teaching itself contribute to the knowledge base?
4. Compare the author's response with your own.

THE CONTRIBUTORS

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Jimmy E. Nations teaches first-grade children at Westwood School in Dalton, Georgia, where he has also served as MIL Steering Committee Chair. He taught previously in Florida and at the UCLA laboratory school. He also served as Assistant Director of the Department of Curriculum and Instruction in Montgomery County, Maryland, and as a senior educational consultant for Denoyer-Geppert Company.

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Nel Ward is librarian at Maryvale High School in Phoenix, Arizona, where she has served as MIL Steering Committee Chair. She is an ardent advocate for students, better education delivery, teacher empowerment, and shared decision making. Her publications include weekly *Updates*, abstracts of information about teaching and learning for her school's faculty and other educators in the area.

Joanne Schnesk is a kindergarten teacher at Stewart Community School in Flint, Michigan. Her greatest professional interest has always been early childhood education. Her involvement as a chairperson in MIL has furthered this interest by increasing the availability of research and by allowing interaction with other early elementary teachers in the MIL network.

Gary Rackliffe is the MIL site-based consultant for Stewart Elementary School in Flint, Michigan He is a PhD candidate at Michigan State University where he teaches courses in research and curriculum. His research interests include curriculum tranformations and the study of teachers in situations requiring new knowledge.

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Jay Sugarman is an elementary school teacher in the Brookline, Massachusetts Public Schools and a college instructor in teacher education. Interested in providing forums for educators to discuss their roles, he founded *Reflections*, an education journal. He was recently selected as a Christa McAuliffe Fellow and, during a year-long sabbatical, worked as a member of the Teacher Assessment Project at Stanford University.