

Preface

NEW TO THIS EDITION

Like the tenth edition, the eleventh edition reflects a combination of both unsolicited and solicited input. Positive feedback suggested aspects of the text that should not be changed—the writing style and the focus on ethical practice, for example. Those aspects remain. However, for the first time in many years, the Table of Contents reflects a new organization for the book. Part I, Foundational Concepts and Processes retains the same six chapters from the 10th edition, but Part II, Research Designs, includes all of the research design chapters that were previously separated into quantitative research designs and qualitative research designs. This reflects our decision to provide a comprehensive discussion of all the research designs before discussing data analysis and interpretation. Part III, Working with Quantitative and Qualitative Data brings together discussions of descriptive statistics, inferential statistics, and qualitative data collection and analysis. The intent of this new section is to provide a comprehensive section on both quantitative and qualitative data analysis and interpretation that reflects the increasing application of mixed methods designs in educational research. Part IV, Reporting and Critiquing Research effectively remains the same.

Content changes reflect the inclusion of new topics and the expansion or clarification of existing topics. There are many improvements in this edition, and we describe the more significant highlights here:

- All research articles have been annotated and now include descriptive annotations (what is the researcher doing) and reflective/evaluative annotations (how did the researcher's decisions support or challenge the chosen research design). These annotations will scaffold the readers' understanding of the content of the chapters to the sample journal articles.
- Chapter 1 (and subsequent chapters throughout the book) include a new “Write Like a Researcher” Feature that have been designed specifically with the purpose of encouraging new researchers to start writing early in the research process.
- Chapter 3 has undergone significant revision because of the way technology has affected the literature review process. Changes include a Digital Research Tools feature on Google Book and Google Scholar, step-by-step directions for an ERIC EBSCO search that maximizes the power of university library consortium agreements to identify fully online journal articles, a “Write Like a Researcher” feature that encourages new researchers to start their writing of the review of related literature very early in the research process.
- Chapter 8 on experimental research has been significantly updated to reflect 21st century discussions about validity, effect size, power, and quasi-experimental designs.
- Chapter 15 on mixed methods designs has been significantly updated to reflect the expansion of three basic and three advanced mixed methods designs currently being used in educational research settings.
- The chapters on Descriptive and Inferential Statistics (now Chapters 17 and 18 in Part III Working with Quantitative and Qualitative Data) have been updated to reflect new versions of SPSS and Excel.

In addition, we have added new tables and figures throughout the text. Every chapter has been edited and updated. References have been updated. Appendix A that historically contained tables related to random numbers, and so on, has been deleted and replaced with links throughout the book to online sources that provide the same information.

PHILOSOPHY AND PURPOSE

This text is designed primarily for use in the introductory course in educational research that is a basic requirement for many graduate programs.

Because the topic coverage of the text is relatively comprehensive, it may be easily adapted for use in either a senior-level undergraduate course or a more advanced graduate-level course.

The philosophy that guided the development of the current and previous editions of this text was the conviction that an introductory research course should be more oriented toward skill and application than toward theory. Thus, the purpose of this text is for students to become familiar with research mainly at a “how-to” skill and application level. The authors do not mystify students with theoretical and statistical jargon. They strive to provide a down-to-earth approach that helps students acquire the skills and knowledge required of a competent consumer and producer of educational research. The emphasis is not just on what the student knows but also on what the student can do with what he or she knows. It is recognized that being a “good” researcher involves more than the acquisition of skills and knowledge; in any field, important research is usually produced by those who through experience have acquired insights, intuitions, and strategies related to the research process. Research of any worth, however, is rarely conducted in the absence of basic research skills and knowledge. A fundamental assumption of this text is that the competencies required of a competent consumer of research overlap considerably with those required of a competent producer of research. A person is in a much better position to evaluate the work of others after she or he has performed the major tasks involved in the research process.

ORGANIZATION AND STRATEGY

The overall strategy of the text is to promote students’ attainment of a degree of expertise in research through the acquisition of knowledge and by involvement in the research process.

Organization

In the eleventh edition, Part I “Foundational Concepts and Processes” includes discussion of the scientific and disciplined inquiry approach and its application in education. The main steps in the research process and the purpose and methods of the various research designs are discussed. In Part I,

each student selects and delineates a research problem of interest that has relevance to his or her professional area. Throughout the rest of the text, the student then simulates the procedures that would be followed in conducting a study designed to investigate the research problem; each chapter develops a specific skill or set of skills required for the execution of such a research design. Specifically, the student learns about the application of the scientific method in education and the ethical considerations that affect the conduct of any educational research (Chapter 1), identifies a research problem and formulates hypotheses (Chapter 2), conducts a review of the related literature (Chapter 3), develops a research plan (Chapter 4), selects and defines samples (Chapter 5), and evaluates and selects measuring instruments (Chapter 6). Throughout these chapters are parallel discussions of quantitative and qualitative research constructs. This organization, with increased emphasis on ethical considerations in the conduct of educational research and the skills needed to conduct a comprehensive review of related literature, allows the student to see the similarities and differences in research designs and to understand more fully how the nature of the research question influences the selection of a research design. Part II “Research Designs” includes description and discussion of different quantitative research designs, qualitative research designs, mixed methods research designs, and action research designs. Part III “Working with Quantitative and Qualitative Data” includes two chapters devoted to the statistical approaches and the analysis and interpretation of quantitative data, and two chapters describing the collection, analysis, and interpretation of qualitative data. Part IV “Reporting and Critiquing Research” focuses on helping the student prepare a research report, either for the completion of a degree requirement or for publication in a refereed journal, and an opportunity for the student to apply the skills and knowledge acquired in Parts I through III to critique a research report.

Strategy

This text represents more than just a textbook to be incorporated into a course; it is a total instructional system that includes stated learning outcomes, instruction, and procedures for evaluating

each outcome. The instructional strategy of the system emphasizes the demonstration of skills and individualization within this structure. Each chapter begins with a list of learning outcomes that describes the knowledge and skills that the student should gain from the chapter. In many instances, learning outcomes may be assessed either as written exercises submitted by students or by tests, whichever the instructor prefers. In most chapters, a task to be performed is described next. Tasks require students to demonstrate that they can perform particular research skills. Because each student works with a different research problem, each student demonstrates the competency required by a task as it applies to his or her own problem. With the exception of Chapter 1, an individual chapter is directed toward the attainment of only one task (occasionally, students have a choice between a quantitative and qualitative task).

Text discussion is intended to be as simple and straightforward as possible. Whenever feasible, procedures are presented as a series of steps, and concepts are explained in terms of illustrative examples. In a number of cases, relatively complex topics or topics beyond the scope of the text are presented at a very elementary level, and students are directed to other sources for additional, in-depth discussion. There is also a degree of intentional repetition; a number of concepts are discussed in different contexts and from different perspectives. Also, at the risk of eliciting more than a few groans, an attempt has been made to sprinkle the text with touches of humor—a hallmark of this text spanning three decades—and perhaps best captured by the pictures and quotes that open each chapter. Each chapter includes a detailed, often lengthy summary with headings and subheadings directly parallel to those in the chapter. The summaries are designed to facilitate both the review and location of related text discussion. Finally, each chapter (or part) concludes with suggested criteria for evaluating the associated task and with an example of the task produced by a former introductory educational research student. Full-length articles, reprinted from the educational research literature, appear at the ends of all chapters presenting research designs and serve as illustrations of “real-life” research using that design. For the 11th edition all of these articles have been annotated with descriptive and evaluative annotations.

SUPPLEMENTARY MATERIALS

The following resources are available for instructors to download from www.pearsonhighered.com/educator. Enter the author, title of the text, or the ISBN number, then select this text, and click on the “Resources” tab. Download the supplement you need. If you require assistance in downloading any resources, contact your Pearson representative.

Instructor’s Resource Manual With Test Bank

The *Instructor’s Resource Manual with Test Bank* is divided into two parts. The Instructor’s Resource Manual contains, for each chapter, suggested activities that have been effectively used in Educational Research courses, strategies for teaching, and selected resources to supplement the textbook content. The test bank contains multiple-choice items covering the content of each chapter, newly updated for this edition, and can be printed and edited or used with TestGen[®].

TestGen[®]

TestGen is a powerful test generator available exclusively from Pearson Education publishers. You install TestGen on your personal computer (Windows or Macintosh) and create your own tests for classroom testing and for other specialized delivery options, such as over a local area network or on the web. A test bank, which is also called a Test Item File (TIF), typically contains a large set of test items, organized by chapter and ready for your use in creating a test, based on the associated textbook material. Assessments may be created for both print and testing online.

The tests can be downloaded in the following formats:

- TestGen Testbank file—PC
- TestGen Testbank file—MAC
- TestGen Testbank—Blackboard 9 TIF
- TestGen Testbank—Blackboard CE/Vista (WebCT) TIF
- Angel Test Bank (zip)
- D2L Test Bank (zip)
- Moodle Test Bank
- Sakai Test Bank (zip)

PowerPoint® Slides

The PowerPoint® slides highlight key concepts and summarize text content to help students understand, organize, and remember core concepts and ideas. They are organized around chapter learning outcomes to help instructors structure class presentations.

ACKNOWLEDGMENTS

I sincerely thank everyone who provided input for the development of this edition. The following individuals made thoughtful and detailed suggestions and comments for improving the eleventh edition: M.H. Clark, University of Central Florida; Anne Dahlman, Minnesota State University, Mankato; Dwight R. Gard, Texas Tech University; Jann W. MacInnes, University of Florida; Lauren Saenz, Boston College; and Rishi Sriram, Baylor University. These reviewers contributed greatly to the eleventh edition and their efforts are very much appreciated.

This edition benefited from the efforts of two editors: Kevin Davis and Gail Gottfried. A few words of thanks are in order here. For nearly 20 years I have been fortunate to work with Kevin Davis, Vice President and Publisher at Pearson. Kevin gave me my textbook start in 1997 when he offered me a contract to write *Action Research: A Guide for the Teacher Researcher* (now in its fifth edition). Kevin has taught me a great deal about writing, and I will always be indebted to him for trusting me with stewardship of this wonderful text. I have also been fortunate to work with my Developmental Editor, Gail Gottfried, for a number of years spanning both my action research and educational research books. My virtual relationship with Gail is remarkable. While we have never met face-to-face I trust and respect all the contributions she has made to my work over the years. I benefit greatly from Gail's creative thinking about how to make an educational research textbook meaningful

and fun. Also at Pearson, Lauren Carlson ably shepherded the manuscript through development and production, responded to my cries for help, and kept me on track. An author does not take on the task of a major revision of a text of this magnitude without the commitment and support of excellent editors. Kevin and Gail were instrumental in the development of this edition and I sincerely thank them for their professionalism, patience, caring, and sense of humor.

I believe that I have made a positive contribution to this text, now my fourth edition, and added to the wisdom of earlier editions by L. R. Gay and Peter Airasian. Long-time users of the text will still “hear” Lorrie Gay's voice throughout the text, but increasingly there is an Aussie accent and sense of humor creeping its way into the pages!

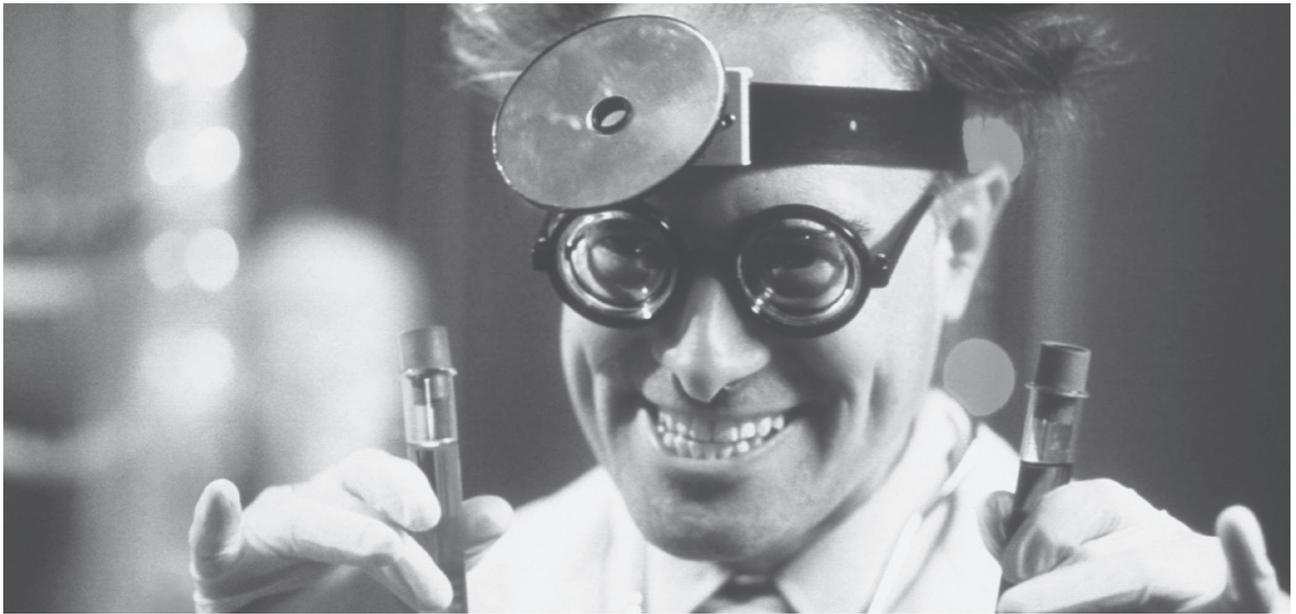
I wish to thank my friend and colleague Dr. Ken Kempner (Emeritus Professor, Southern Oregon University) for his thoughtful work on revising the descriptive and inferential statistics chapters and feedback on other quantitative chapters in the text.

Finally, I want to thank my best friend and wife, Dr. Donna Mills (Southern Oregon University), and my son, Jonathan, for their love, support, and patience. Their commitment to my work is always appreciated and never taken for granted. The completion of this edition signals another new era in my life as my son Jonathan completes his undergraduate degree and contemplates work and graduate school, and Donna prepares for retirement after a very successful university career. I continue to suggest to Jonathan that one day he may want to take over my books. While it is safe to say that he is less than excited by the prospect—his undergraduate experiences in the Clark Honors College at the University of Oregon and his study abroad experiences at the University of Oxford have seen his interest in research increase dramatically!

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CHAPTER ONE

Introduction to Educational Research



Little Heroes 3, 2002

“Despite a popular stereotype that depicts researchers as spectacled, stoop-shouldered, elderly gentlemen who endlessly add chemicals to test tubes, every day thousands of men and women of all ages, shapes, and sizes conduct educational research in a wide variety of settings.” (p. 3)

LEARNING OUTCOMES

After reading Chapter 1, you should be able to do the following:

1. Briefly describe the reasoning involved in the scientific method.
2. Explain why researchers would use quantitative, qualitative, mixed methods, or action research designs to address a specific research problem.
3. Briefly define and state the major characteristics of these research designs: survey, correlational, causal-comparative, experimental, single-subject, narrative, ethnographic, case study, mixed methods, and action research.
4. Explain the purposes of basic research, applied research, evaluation research, research and development (R&D), and action research.
5. Explain the ethical obligations that educational researchers have and describe the codes and procedures they must follow to ensure they adhere to them.

Completing Chapter 1 should enable you to perform the following tasks:

TASKS 1A, 1B

Identify and briefly state the following for both research studies at the end of this chapter:

1. The research design
2. The rationale for the choice of the research design
3. The major characteristics of the research design, including research procedures, method of analysis, and major conclusions
4. Ethical issues the authors experienced and how they were addressed

(See Performance Criteria, p. 33.)

TASK 1C

Classify given research studies based on their characteristics and purposes. (See Performance Criteria, p. 33.)

WELCOME!

If you are taking a research course because it is required in your program of studies, raise your right hand. If you are taking a research course because it seems like it will be a really fun elective, raise your left hand. We thought you may not be here of your own free will. Although you may be required to take this course, you are not the innocent victim of one or more sadists. Your professors have several legitimate reasons for believing this research course is an essential component of your education.

First, educational research findings contribute significantly to both educational theory and educational practice. As a professional, you need to know how to find, understand, and evaluate these findings. And when you encounter research findings in professional publications or in the media, you have a responsibility, as a professional, to distinguish between legitimate and ill-founded research claims. Second, although many of you will be primarily critical consumers of research,

some of you will decide to become educational researchers. A career in research opens the door to a variety of employment opportunities in universities, research centers, and business and industry.

Despite a popular stereotype that depicts researchers as spectacled, stoop-shouldered, elderly gentlemen (a stereotype I am rapidly approaching!) who endlessly add chemicals to test tubes, every day thousands of men and women of all ages and postures conduct educational research in a wide variety of settings. Every year many millions of dollars are spent in the quest for knowledge related to teaching and learning. Educational research has contributed many findings concerning principles of behavior, learning, and retention of knowledge—many of which can also be applied to curriculum, instruction, instructional materials, and assessment techniques. Both the quantity and the quality of research are increasing, partly because researchers are better trained. Educational research classes have become core components of preservice teacher education programs, as well as the cornerstone of advanced degree programs.

We recognize that educational research is a relatively unfamiliar discipline for many of you. Our first goals, then, are to help you acquire a general understanding of research processes and to help you develop the perspective of a researcher. We begin by examining the scientific method.

THE SCIENTIFIC METHOD

What is knowledge? And how do we come to “know” something? Experience is certainly one of the fundamental ways we come to know about and understand our world. For example, a child who touches something hot learns that high heat hurts. We know other things because a trusted authority, such as a parent or a teacher, told us about them. Most likely, much of your knowledge of current world events comes secondhand, from things you have read or heard from a source you trust.

Another way we come to know something is through thinking, through reasoning. Reasoning refers to the process of using logical thought to reach a conclusion. We can reason *inductively* or *deductively*. **Inductive reasoning** involves developing generalizations based on observation of a limited number of related events or experiences. Consider the following example of inductive reasoning:

Observation: An instructor examines five research textbooks. Each contains a chapter about sampling.

Generalization: The instructor concludes that all research textbooks contain a chapter about sampling.

Deductive reasoning involves essentially the reverse process—arriving at specific conclusions based on general principles, observations, or experiences (i.e., generalizations)—as shown in the next example.

Observations: All research textbooks contain a chapter on sampling. The book you are reading is a research text.

Generalization: This book must contain a chapter on sampling. (Does it?)

Although people commonly use experience, authority, inductive reasoning, and deductive reasoning to learn new things and draw new conclusions from that knowledge, each of these

approaches to understanding has limitations when used in isolation. Some problems associated with experience and authority as sources of knowledge are graphically illustrated in a story told about Aristotle. According to the story, one day Aristotle caught a fly and carefully counted and recounted the legs. He then announced that flies have five legs. No one questioned the word of Aristotle. For years his finding was accepted uncritically. Unfortunately, the fly that Aristotle caught just happened to be missing a leg! Whether or not you believe the story, it illustrates the limitations of relying on personal experience and authority as sources of knowledge.

The story also points out a potential problem with inductive reasoning: Generalizing from a small sample, especially one that is atypical, can lead to errors. Deductive reasoning, too, is limited by the evidence in the original observations. If every research text really does have a chapter on sampling, and if this book really is a research text, then it follows that this book must have a chapter on sampling. However, if one or more of the premises is false (perhaps some research texts do not have a chapter on sampling), your conclusion may also be wrong.

When we rely exclusively on these common approaches to knowing, the resulting knowledge is susceptible to error and may be of limited value to understanding the world beyond our immediate experience. However, experience, authority, and inductive and deductive reasoning are very effective when used together as integral components of the scientific method. The **scientific method** is an orderly process entailing a number of steps: recognition and definition of a problem, formulation of hypotheses, collection of data, analysis of data, and statement of conclusions regarding confirmation or disconfirmation of the hypotheses (i.e., a researcher forms a **hypothesis**—an explanation for the occurrence of certain behaviors, phenomena, or events—as a way of predicting the results of a research study and then collects data to test that prediction). These steps can be applied informally to solve everyday problems such as the most efficient route to take from home to work or school, the best time to go to the bank, or the best kind of computer to purchase. The more formal application of the scientific method is standard in research; it is more efficient and more

reliable than relying solely on experience, authority, inductive reasoning, and deductive reasoning as sources of knowledge.

Limitations of the Scientific Method

The steps in the scientific method guide researchers in planning, conducting, and interpreting research studies. However, it is important to recognize some limitations of the method. First, the scientific method cannot answer all questions. For example, applying the scientific method will not resolve the question “Should we legalize euthanasia?” The answers to questions like this one are influenced by personal philosophy, values, and ethics.

Second, application of the scientific method can never capture the full richness of the individuals and the environments under study. Although some applications of the method lead to deeper understanding of the research context than others, no application—and in fact no research approach—provides full comprehension of a site and its inhabitants. No matter how many variables one studies or how long one is immersed in a research context, other variables and aspects of context will remain unexamined. Thus, the scientific method and, indeed, all types of inquiry give us a simplified version of reality.

Third, our measuring instruments always have some degree of error. The variables we study are often proxies for the real behavior we seek to examine. For example, even if we use a very precisely constructed multiple-choice test to assess a person’s values, we will likely gather information that gives us a picture of that person’s beliefs about his or her values. However, we aren’t likely to have an adequate picture of how that person acts, which may be the better reflection of the person’s real values.

More broadly, all educational inquiry, not just the scientific method, is carried out with the cooperation of participants who agree to provide researchers with data. Because educational researchers deal with human beings, they must consider a number of ethical concerns and responsibilities to the participants. For example, they must shelter participants from real or potential harm. They must inform participants about the nature of the planned research and address the expectations of the participants. These factors can limit and skew results. All these limitations will be addressed in later sections of this book.

Application of the Scientific Method in Education

Research is the formal, systematic application of the scientific method to the study of problems; **educational research** is the formal, systematic application of the scientific method to the study of educational problems. The goal of educational research is essentially the same as the goal of all science: to describe, explain, predict, or control phenomena—in this case, educational phenomena. As we mentioned previously, it can be quite difficult to describe, explain, predict, and control situations involving human beings, who are by far the most complex of all organisms. So many factors, known and unknown, operate in any educational environment that it can be extremely difficult to identify specific causes of behaviors or to generalize or replicate findings. The kinds of rigid controls that can be established and maintained in a biochemistry laboratory, for instance, are impossible in an educational setting. Even describing behaviors, based on observing people, has limits. Observers may be subjective in recording behaviors, and people who are observed may behave atypically just because they are being watched. Chemical reactions, on the other hand, are certainly not aware of being observed! Nevertheless, behavioral research should not be viewed as less scientific than natural science research conducted in a lab.

Despite the difficulty and complexity of applying the scientific method in educational settings, the steps of the scientific method used by educational researchers are the same as those used by researchers in other more easily controlled settings:

1. *Selection and definition of a problem.* A problem is a question of interest that can be tested or answered through the collection and analysis of data. Upon identifying a research question, researchers typically review previously published research on the same topic and use that information to hypothesize about the results. In other words, they make an educated guess about the answer to the question.
2. *Execution of research procedures.* The procedures reflect all the activities involved in collecting data related to the problem

(e.g., how data are collected and from whom). To a great extent, the specific procedures are dictated by the research question and the variables involved in the study.

3. *Analysis of data.* Data are analyzed in a way that permits the researcher to test the research hypothesis or answer the research question. Analysis usually involves application of one or more statistical technique. For some studies, data analysis involves verbal synthesis of narrative data; these studies typically involve new insights about the phenomena in question, generate hypotheses for future research, or both.
4. *Drawing and stating conclusions.* The conclusions, which should advance our general knowledge of the topic in question, are based on the results of data analysis. They should be stated in terms of the original hypothesis or research question. Conclusions should indicate, for example, whether the research hypothesis was supported or not. For studies involving verbal synthesis, conclusions are much more tentative.

DIFFERENT APPROACHES TO EDUCATIONAL RESEARCH

All educational inquiry ultimately involves a decision to study or describe something—to ask some question and seek an answer. All educational inquiry necessitates that data of some kind be collected, that the data be analyzed in some way, and that the researcher come to some conclusion or interpretation. In other words, all educational inquiry shares the same four basic actions we find in the scientific method. However, it is not accurate to say that all educational research is an application of the scientific method. Important differences exist between the types of problems researchers investigate and the questions they ask, the types of data they collect, the form of data analysis, and the conclusions that the researcher can draw meaningfully and with validity.

The Continuum of Research Philosophies

Historically, educational researchers used approaches that involved the use of the scientific method. However, over the last four decades,

researchers have adopted diverse philosophies toward their research. Now, there are certain philosophical assumptions that underpin an educational researcher's decision to conduct research. These philosophical assumptions address issues related to the nature of reality (ontology), how researchers know what they know (epistemology), and the methods used to study a particular phenomenon (methodology), with an emphasis on quantitative or qualitative methods. As Creswell¹ notes, historically, researchers compared the philosophical assumptions that underpinned qualitative and quantitative research approaches in order to establish the legitimacy of qualitative research, but given the evolution of qualitative and quantitative research over the past four decades, there is no longer any need to justify one set of philosophical assumptions over another set of assumptions.

Quantitative Research

Educational researchers have also followed well-defined, widely accepted procedures for stating research topics, carrying out the research process, analyzing the resulting data, and verifying the quality of the study and its conclusions. Often, these research procedures are based on what has come to be known as a quantitative approach to conducting and obtaining educational understandings. The quantitative framework in educational research involves the application of the scientific method to try to answer questions about education. At the end of this chapter you will find an example of quantitative research published in *Child Development* (a refereed journal): “Can Instructional and Emotional Support in the First-Grade Classroom Make a Difference for Children at Risk of School Failure?” (Hamre & Pianta, 2005). As this title suggests, this research investigates the ways in which children's risk of school failure may be moderated by instructional and emotional support from teachers.

Quantitative research is the collection and analysis of numerical data to describe, explain, predict, or control phenomena of interest. Part II of the text will address in detail specific quantitative research designs that satisfy the assumptions

¹ Creswell, J. W. (2013). *Qualitative Inquiry & Research Design: Choosing Among Five Approaches* (3rd ed.). Thousand Oaks, CA: Sage.

underpinning a quantitative approach to research. A quantitative research approach entails more than just the use of numerical data. At the outset of a study, quantitative researchers state the hypotheses to be examined and specify the research procedures that will be used to carry out the study. They also maintain control over contextual factors that may interfere with the data collection and identify a sample of participants large enough to provide statistically meaningful data. Many quantitative researchers have little personal interaction with the participants they study because they frequently collect data using paper-and-pencil, noninteractive instruments. The analysis of numerical data can be complex but addressed systematically and Part III of the text will provide a detailed description for how to work with quantitative data.

Underlying quantitative research methods is the philosophical belief or assumption that we inhabit a relatively stable, uniform, and coherent world that we can measure, understand, and generalize about. This view, adopted from the natural sciences, implies that the world and the laws that govern it are somewhat predictable and can be understood by scientific research and examination. In this quantitative perspective, claims about the world are not considered meaningful unless they can be verified through direct observation.

Qualitative Research

Qualitative research is the collection, analysis, and interpretation of comprehensive narrative and visual (i.e., non-numerical) data to gain insights into a particular phenomenon of interest. Part II of the text will address in detail specific qualitative research designs that satisfy the underpinning assumptions of a qualitative approach to research. Qualitative research approaches are based on different beliefs and designed for different purposes than quantitative research approaches. For example, qualitative researchers do not necessarily accept the view of a stable, coherent, uniform world. They argue that all meaning is situated in a particular perspective or context, and because different people and groups often have different perspectives and contexts, the world has many different meanings, none of which is necessarily more valid or true than another.

Qualitative research approaches tend to evolve as understanding of the research context and

participants deepens (think back to the discussion of inductive reasoning). As a result, qualitative researchers often avoid stating hypotheses before data are collected, and they may examine a particular phenomenon without a guiding statement about what may or may not be true about that phenomenon or its context. However, qualitative researchers do not enter a research setting without any idea of what they intend to study. Rather, they commence their research with “foreshadowed problems.”² This difference is important—quantitative research usually tests a specific hypothesis; qualitative research often does not.

Additionally, in qualitative research, context is not controlled or manipulated by the researcher. The effort to understand the participants’ perspective requires researchers using qualitative methods to interact extensively and intimately with participants during the study, using time-intensive data collection methods such as interviews and observations. As a result, the number of participants tends to be small, and qualitative researchers analyze the data inductively by categorizing and organizing it into patterns that produce a descriptive, narrative synthesis.

Qualitative research differs from quantitative research in two additional ways: (1) Qualitative research often involves the simultaneous collection of a wealth of narrative and visual data over an extended period of time, and (2) as much as is possible, data collection occurs in a naturalistic setting. In quantitative studies, in contrast, research is most often conducted in researcher-controlled environments under researcher-controlled conditions, and the activities of data collection, analysis, and writing are separate, discrete activities. Because qualitative researchers strive to study people and events in their naturalistic settings, qualitative research is sometimes referred to as naturalistic research, naturalistic inquiry, or field-oriented research.

These two characteristics of qualitative research, the simultaneous study of many aspects of a phenomenon and the attempt to study things as they exist naturally, help in part to explain the growing enthusiasm for qualitative research in education, especially in applied teacher practitioner-oriented research. Some researchers and educators

² *Argonauts of the Western Pacific* (p. 9), by B. Malinowski, 1922. London: Routledge.

feel that certain kinds of educational problems and questions do not lend themselves well to quantitative methods, which use principally numerical analysis and try to control variables in very complex environments. As qualitative researchers point out, findings should be derived from research conducted in real-world settings to have relevance to real-world settings.

At the end of this chapter, you will find an example of qualitative research published in *Action in Teacher Education* (a refereed journal): “Developing Teacher Epistemological Sophistication about Multicultural Curriculum: A Case Study” (Sleeter, 2009). This research investigates how teachers’ thinking about curriculum develops during a teacher preparation program and how the lessons from the case study might inform teacher education pedagogy. And, of course, the use of the word *epistemological* in the title introduces you to the language of educational research!

Mixed Methods Research

Mixed methods research combines quantitative and qualitative approaches by including both quantitative and qualitative data in a single study. The purpose of mixed methods research is to build on the synergy and strength that exists between quantitative and qualitative research approaches to understand a phenomenon more fully than is possible using either quantitative or qualitative approaches alone. Chapter 15 will describe in detail six mixed methods research designs (convergent-parallel, explanatory, exploratory, experimental, social justice, and multistage evaluation). However, the basic differences among the designs are related to the priority given to the following areas:

- the type of data collected (i.e., qualitative and quantitative data are of equal weight, or one type of data has greater weight than the other)
- the sequence of data collection (i.e., both types of data are collected during the same time period, or one type of data is collected in each sequential phase of the project)
- the analysis techniques (i.e., either an analysis that combines the data or one that keeps the two types of data separate).

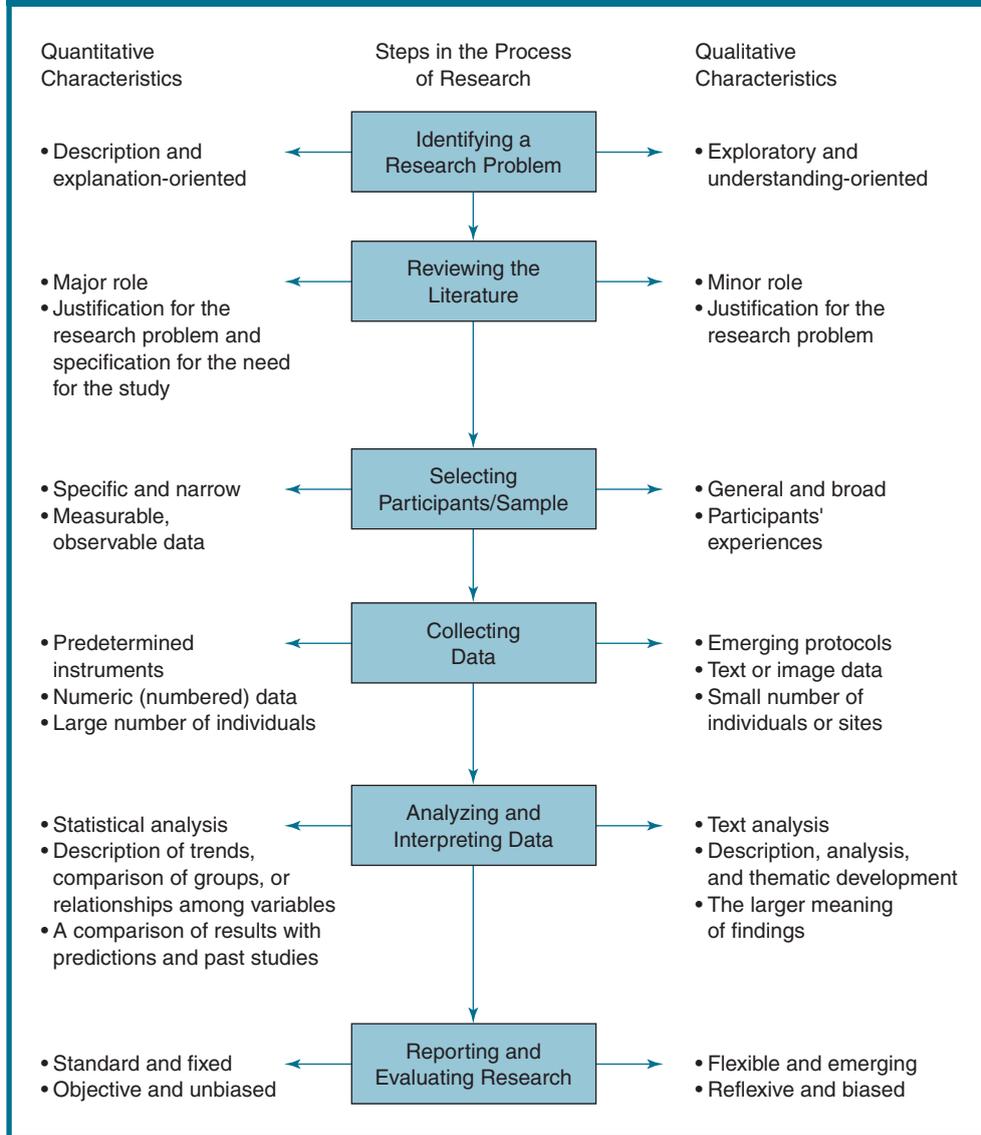
Characteristics of Quantitative and Qualitative Research Approaches

Earlier in this chapter, we presented four general, conceptual research steps used in the scientific method. In this section we expand the number of steps to six, which are followed by both quantitative researchers and qualitative researchers. As we discuss in subsequent chapters in Part II, however, the application of the steps differs depending on the research design. For example, the research procedures in qualitative research are often less rigid than those in quantitative research. Similarly, although both quantitative and qualitative researchers collect data, the nature of the data differs. Figure 1.1 compares the six steps of qualitative and quantitative research approaches and lists traits that characterize each approach at every step:

1. *Identifying a research topic.* Often the initial topic is narrowed to be more manageable.
2. *Reviewing the literature.* The researcher examines existing research to identify useful information and strategies for carrying out the study.
3. *Selecting participants.* Participants are purposefully selected (i.e., not randomly selected) and are usually fewer in number than in quantitative samples.
4. *Collecting data.* Qualitative data tend to be gathered from interviews, observations, and artifacts.
5. *Analyzing and interpreting data.* The researcher analyzes the themes and general tendencies and provides interpretations of the data.
6. *Reporting and evaluating the research.* The researcher summarizes and integrates the qualitative data in narrative and visual form.

Table 1.1 provides another snapshot of quantitative and qualitative research characteristics. Despite the differences between them, you should not consider quantitative and qualitative research approaches to be oppositional. Taken together, they represent the full range of educational research designs. The terms *quantitative* and *qualitative* are used to differentiate one approach from the other conveniently. If you see yourself as a positivist—the belief that

FIGURE 1.1 • Characteristics of quantitative and qualitative research



Source: *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research* (5th ed.), (pp. 20, 464, 504, 541), by Creswell, John W., © 2015. Reprinted by permission of Pearson Education, Inc., Upper Saddle River, NJ.

qualities of natural phenomena must be verified by evidence before they can be considered knowledge—that does not mean you cannot use or learn from qualitative research methods. The same holds true for nonpositivist, phenomenologist qualitative researchers. Depending on the nature of the question, topic, or problem to be investigated, one of these approaches will generally be more appropriate than the other, although

selecting a primary approach does not preclude borrowing from the other. In fact, both may be utilized in the same studies, as when the administration of a (quantitative) questionnaire is followed by a small number of detailed (qualitative) interviews to obtain deeper explanations for the numerical data.

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TABLE 1.1 • Overview of qualitative and quantitative research characteristics

	Quantitative Research	Qualitative Research
Type of data collected	Numerical data	Non-numerical narrative and visual data
Research problem	Hypothesis and research procedures stated before beginning the study	Research problems and methods evolve as understanding of topic deepens
Manipulation of context	Yes	No
Sample size	Larger	Smaller
Research procedures	Relies on statistical procedures	Relies on categorizing and organizing data into patterns to produce a descriptive, narrative synthesis
Participant interaction	Little interaction	Extensive interaction
Underlying belief	We live in a stable and predictable world that we can measure, understand, and generalize about.	Meaning is situated in a particular perspective or context that is different for people and groups; therefore, the world has many meanings.

CLASSIFICATION OF RESEARCH BY DESIGN

A research design comprises the overall strategy followed in collecting and analyzing data. Although there is some overlap, most research studies follow a readily identifiable design. The largest distinction we can make in classifying research by design is the distinction between quantitative and qualitative approaches. Quantitative and qualitative research approaches, in turn, include several distinct types or designs with a focus on unique research problems.

Quantitative Approaches

Quantitative research approaches are applied to describe current conditions, investigate relations, and study cause–effect phenomena. Survey research is often designed to describe current conditions. Studies that investigate the relations between two or more variables are correlational research. Experimental studies and causal–comparative studies provide information about cause–effect outcomes. Studies that focus

on the behavior change an individual exhibits as a result of some intervention fall under the heading of single-subject research.

Survey Research

Survey research determines and reports the way things are; it involves collecting numerical data to test hypotheses or answer questions about the current status of the subject of study. One common type of survey research involves assessing the preferences, attitudes, practices, concerns, or interests of a group of people. A pre-election political poll and a survey about community members' perception of the quality of the local schools are examples. Survey research data are mainly collected through questionnaires, interviews, and observations.

Although survey research sounds very simple, there is considerably more to it than just asking questions and reporting answers. Because researchers often ask questions that have not been asked before, they usually have to develop their own measuring instrument for each survey study. Constructing questions for the intended respondents requires clarity, consistency, and tact. Other

major challenges facing survey researchers are participants' failure to return questionnaires, their willingness to be surveyed over the phone, and their ability to attend scheduled interviews. If the response rate is low, then valid, trustworthy conclusions cannot be drawn. For example, suppose you are doing a study to determine the attitudes of principals toward research in their schools. You send a questionnaire to 100 principals and include the question "Do you usually cooperate if your school is asked to participate in a research study?" Forty principals respond, and they all answer "Yes." It's certainly a mistake to conclude that principals in general cooperate. Although all those who responded said yes, those 60 principals who did not respond may never cooperate with researchers. After all, they didn't cooperate with you! Without more responses, it is not possible to make generalizations about how principals feel about research in their schools.

Following are examples of questions that can be investigated in survey research studies, along with typical research designs:

- *How do second-grade teachers spend their teaching time?* Second-grade teachers are asked to fill out questionnaires, and results are presented as percentages (e.g., teachers spent 50% of their time lecturing, 20% asking or answering questions, 20% in discussion, and 10% providing individual student help).
- *How will citizens of Yourtown vote in the next school board election?* A sample of Yourtown citizens complete a questionnaire or interview, and results are presented as percentages (e.g., 70% said they will vote for Peter Pure, 20% named George Graft, and 10% are undecided). Survey research is described in more detail in Chapter 7.

Correlational Research

Correlational research involves collecting data to determine whether, and to what degree, a relation exists between two or more quantifiable variables. A **variable** is a placeholder that can assume any one of a range of values; for example, intelligence, height, and test score are variables. At a minimum, correlational research requires information about at least two variables obtained from a single group of participants.

The purpose of a correlational study may be to establish relations or use existing relations to make predictions. For example, a college admissions director may be interested in answering the question "How do the SAT scores of high school seniors correspond to the students' first-semester college grades?" If students' SAT scores are strongly related to their first-semester grades, SAT scores may be useful in predicting how students will perform in their first year of college. On the other hand, if there is little or no correlation between the two variables, SAT scores likely will not be useful as predictors.

Correlation refers to a quantitative measure of the degree of correspondence. The degree to which two variables are related is expressed as a **correlation coefficient**, which is a number between +1.00 and -1.00. Two variables that are not related have a correlation coefficient near 0.00. Two variables that are highly correlated will have a correlation coefficient near +1.00 or -1.00. A number near +1.00 indicates a positive correlation: As one variable increases, the other variable also increases (e.g., students with high SAT scores may also have high grade point averages [GPAs]). A number near -1.00 indicates a negative correlation: As one variable increases, the other variable decreases (e.g., a high GPA may correlate negatively with the likelihood of dropping out). Because very few pairs of variables are perfectly correlated, predictions based on them are rarely +1.0 or -1.0.

It is very important to note that the results of correlational studies do not suggest cause-effect relations among variables. Thus, a positive correlation between, for example, self-concept and achievement does not imply that self-concept causes achievement or that achievement causes self-concept. The correlation indicates only that students with higher self-concepts tend to have higher levels of achievement and that students with lower self-concepts tend to have lower levels of achievement. We cannot conclude that one variable is the cause of the other.

Following are examples of research questions tested with correlational studies:

- *What is the relation between intelligence and self-esteem?* Scores on an intelligence test and a measure of self-esteem are acquired

from each member of a given group. The two sets of scores are analyzed, and the resulting coefficient indicates the degree of correlation.

- *Does an algebra aptitude test predict success in an algebra course?* Scores on the algebra aptitude test are correlated with final exam scores in the algebra course. If the correlation is high, the aptitude test is a good predictor of success in algebra.

Correlational research is described in detail in Chapter 8.

Causal–Comparative Research

Causal–comparative research attempts to determine the cause, or reason, for existing differences in the behavior or status of groups of individuals. The cause is a behavior or characteristic believed to influence some other behavior or characteristic and is known as the **grouping variable**. The change or difference in a behavior or characteristic that occurs as a result—that is, the effect—is known as the **dependent variable**. Put simply, causal–comparative research attempts to establish cause–effect relations among groups.

Following are examples of research questions tested with causal–comparative studies (note that the word is *causal*, not *casual*):

- *How does preschool attendance affect social maturity at the end of the first grade?* The grouping variable is preschool attendance (i.e., the variable can take one of two values—students attending preschool and students not attending); the dependent variable, or effect, is social maturity at the end of the first grade. The researcher identifies a group of first-graders who attended preschool and a group who did not, gathers data about their social maturity, and then compares the two groups.
- *How does having a working mother affect a child's school absenteeism?* The grouping variable is the employment status of the mother (again with two possible values—the mother works or does not work); the dependent variable is absenteeism, measured as number of days absent. The researcher identifies a group of students who have working mothers and a group whose mothers do not work, gathers information about their absenteeism, and compares the groups.

A weakness of causal–comparative studies is that, because the cause under study has already occurred, the researcher has no control over it. For example, suppose a researcher wanted to investigate the effect of heavy smoking on lung cancer and designs a study comparing the frequency of lung cancer diagnoses in two groups, long-time smokers and nonsmokers. Because the groups are preexisting, the researcher did not control the conditions under which the participants smoked or did not smoke (this lack of researcher control is why the variable is known as a grouping variable rather than an independent variable). Perhaps a large number of the long-time smokers lived in a smoggy, urban environment, whereas only a few of the nonsmokers were exposed to those conditions. In that case, attempts to draw cause–effect conclusions in the study would be tentative at best. Is it smoking that causes higher rates of lung cancer? Is it living in a smoggy, urban environment? Or is it some unknown combination of smoking and environment? A clear cause–effect link cannot be obtained.

Although causal–comparative research produces limited cause–effect information, it is an important form of educational research. True cause–effect relations can be determined only through experimental research (discussed in the next section), in which the researcher maintains control of an independent variable; but in many cases, an experimental study is inappropriate or unethical. The causal–comparative approach is chosen precisely because the grouping variable either cannot be manipulated (e.g., as with gender, height, or year in school) or should not be manipulated (e.g., as with smoking or prenatal care). For example, to conduct the smoking study as an experiment, a researcher would need to select a large number of participants who had never smoked and divide them into two groups, one directed to smoke heavily and one forbidden to smoke. Obviously, such a study is unethical because of the potential harm to those forced to smoke. A causal–comparative study, which approximates cause–effect results without harming the participants, is the only reasonable approach. Like descriptive and correlational studies, however, causal–comparative research does not produce true experimental research outcomes. Causal–comparative research is described in detail in Chapter 9.

Experimental Research

In **experimental research**, at least one independent variable is manipulated, other relevant variables are controlled, and the effect on one or more dependent variables is observed. True experimental research provides the strongest results of any of the quantitative research approaches because it provides clear evidence for linking variables. As a result, it also offers **generalizability**, or applicability of findings to settings and contexts different from the one in which they were obtained.

Unlike causal-comparative researchers, researchers conducting an experimental study can control an independent variable. They can select the participants for the study, divide the participants into two or more groups that have similar characteristics at the start of the research experiment, and then apply different treatments to the selected groups. They can also control the conditions in the research setting, such as when the treatments will be applied, by whom, for how long, and under what circumstances. Finally, the researchers can select tests or measurements to collect data about any changes in the research groups. The selection of participants from a single pool of participants and the ability to apply different treatments or programs to participants with similar initial characteristics permit experimental researchers to draw conclusions about cause and effect. The essence of experimentation is control, although in many education settings it is not possible or feasible to meet the stringent control conditions required by experimental research.

Following are examples of research questions that are explored with experimental studies:

- *Is personalized instruction from a teacher more effective for increasing students' computational skills than computer instruction?* The independent variable is type of instruction (with two values: personalized instruction and computer instruction); the dependent variable is computational skills. A group of students who have never experienced either personalized teacher instruction or computer instruction are selected and randomly divided into two groups, each taught by one of the methods. After a predetermined time, the students'

computational skills are measured and compared to determine which treatment, if either, produced higher skill levels.

- *Is there an effect of reinforcement on students' attitude toward school?* The independent variable is type of reinforcement (with three values: positive, negative, or no reinforcement); the dependent variable is attitude toward school. The researcher randomly forms three groups from a single large group of students. One group receives positive reinforcement, another negative reinforcement, and the third no reinforcement. After the treatments are applied for a predetermined time, student attitudes toward school are measured and compared for each of the three groups.

Experimental research is described in detail in Chapter 10.

Single-Subject Research

Rather than compare the effects of different treatments (or treatment versus no treatment) on two or more groups of people, experimental researchers sometimes compare a single person's behavior before treatment to behavior exhibited during the course of the experiment. They may also study a number of people together as one group, rather than as individuals. **Single-subject experimental designs** are those used to study the behavior change that an individual or group exhibits as a result of some intervention or treatment. In these designs, the size of the **sample**—the individuals selected from a population for a study—is said to be one.

Following are examples of published studies that used single-subject designs:

- *The effects of a training program with and without reinforced directed rehearsal as a correction procedure in teaching expressive sign language to nonverbal students with mental retardation.* Ten students with moderate to severe mental retardation were studied.³

³ "Effects of Reinforced Directed Rehearsal on Expressive Sign Language Learning by Persons with Mental Retardation," by A. J. Dalrymple and M. A. Feldman, 1992, *Journal of Behavioral Education*, 2(1), pp. 1–16.

■ *The effects of instruction focused on assignment completion on the homework performance of students with learning disabilities.* A single-subject experiment design was used to determine how instruction in a comprehensive, independent assignment completion strategy affected the quality of homework and the homework completion rate of eight students with learning disabilities.⁴

Single-subject experimental research is described in detail Chapter 11.

Qualitative Approaches

Qualitative research seeks to probe deeply into the research setting to obtain in-depth understandings about the way things are, why they are that way, and how the participants in the context perceive them. To achieve the detailed understandings they seek, qualitative researchers must undertake sustained in-depth, in-context research that allows them to uncover subtle, less overt, personal understandings. The field of qualitative research uses a variety of common qualitative research designs. For example, some qualitative researchers focus on the exploration of phenomena that occur within a bounded system (e.g., a person, event, program, life cycle; in a *case study*); some focus in depth on a group's cultural patterns and perspectives to understand participants' behavior and their context (i.e., using *ethnography*); some examine how multiple cultures compare to one another (i.e., *ethnology*); some examine people's understanding of their daily activities (i.e., *ethnomethodology*); some derive theory using multiple steps of data collection and interpretation that link actions of participants to general social science theories or work inductively to arrive at a theory that explains a particular phenomenon (i.e., *grounded theory*); some ask about the meaning of this experience for these participants (i.e., *phenomenology*); some look for common understandings that have emerged to give meaning to participants' interactions (i.e., *symbolic interaction*); some seek to understand the past by studying documents, relics,

and interviews (i.e., *historical research*); and some describe the lives of individuals (i.e., *narrative*). Overall, a collective, generic name for these qualitative approaches is *interpretive research*.⁵

Narrative Research

Narrative research is the study of how different humans experience the world around them; it involves a methodology that allows people to tell the stories of their “storied lives.”⁶ The researcher typically focuses on a single person and gathers data by collecting stories about the person's life. The researcher and participant then construct a written account, known as a narrative, about the individual's experiences and the meanings the individual attributes to the experiences. Because of the collaborative nature of narrative research, it is important for the researcher and participant to establish a trusting and respectful relationship. Another way to think of narrative research is that the narrative is the story of the phenomenon being investigated, and narrative is also the method of inquiry being used by the researcher.⁷ One of the goals of narrative research in education is to increase understanding of central issues related to teaching and learning through the telling and retelling of teachers' stories.

Following is an example of the narrative research approach:

Kristy, an assistant professor of education, is frustrated by what she perceives as the gender-biased distribution of resources within the School of Education (SOE). Kristy shares her story with Winston, a colleague and researcher. In the course of their lengthy recorded conversations, Kristy describes in great detail her view that the SOE dean, George, is allocating more resources for technology upgrades, curriculum materials, and conference travel to her male colleagues. Kristy also shares with Winston her detailed journals, which capture her experiences with George and other faculty members in interactions dealing with the allocation of resources. In addition, Winston

⁴ “Effects of Instruction in an Assignment Completion Strategy on the Homework Performance of Students with Learning Disabilities in General Education Classes,” by C. A. Hughes, K. L. Ruhl, J. B. Schumaker, and D. D. Deshler, 2002, *Learning Disabilities Research and Practice*, 17(1), pp. 1–18.

⁵ For a discussion, see *Qualitative Evaluation and Research Methods* (3rd ed.), M. Q. Patton, 2002, Thousand Oaks, CA: Sage.

⁶ “Stories of Experience and Narrative Inquiry,” by F. M. Connelly and D. J. Clandinin, 1990, *Educational Research*, 19(5), p. 2.

⁷ “Stories,” Connelly and Clandinin, pp. 2–14.

collects artifacts—including minutes of faculty meetings, technology orders, and lists of curriculum materials ordered for the library at the university—that relate to resource allocation.

After collecting all the data that will influence the story, Winston reviews the information, identifies important elements and themes, and retells Kristy's story in a narrative form. After constructing the story with attention given to time, place, plot, and scene, he shares the story with Kristy, who collaborates on establishing its accuracy. In his interpretation of Kristy's unique story of gender bias, Winston describes themes related to power and influence in a hierarchical school of education and the struggles faced by beginning professors to establish their career paths in a culture that is remarkably resistant to change.

Narrative research is described in detail in Chapter 12.

Ethnographic Research

Ethnographic research, or ethnography, is the study of the cultural patterns and perspectives of participants in their natural settings. Ethnography focuses on a particular site or sites that provide the researcher with a context in which to study both the setting and the participants who inhabit it. An ethnographic setting can be defined as anything from a bowling alley to a neighborhood, from a nomadic group's traveling range to an elementary principal's office. The participants are observed as they take part in naturally occurring activities within the setting.

The ethnographic researcher avoids making interpretations and drawing conclusions too early in the study. Instead, the researcher enters the setting slowly, learning how to become accepted by the participants and gaining rapport with them. Then, over time, the researcher collects data in waves, making initial observations and interpretations about the context and participants, then collecting and examining more data in a second wave of refining the initial interpretation, then collecting another wave of data to further refine observations and interpretation, and so on, until the researcher has obtained a deep understanding of both the context and its participants' roles in it. Lengthy engagement in the setting is a key facet of ethnographic research. The researcher organizes

the data and undertakes a cultural interpretation. The result of the ethnographic study is a holistic description and cultural interpretation that represents the participants' everyday activities, values, and events. The study is written and presented as a narrative, which, like the study from which it was produced, may also be referred to as an ethnography.

Following is an example of an ethnographic approach to a research question:

- *What is the Hispanic student culture in an urban community college?* After selecting a general research question and a research site in a community college that enrolls many Hispanic students, the researcher first gains entry to the college and establishes rapport with the participants of the study. Building rapport can be a lengthy process, depending on the characteristics of the researcher (e.g., non-Hispanic versus Hispanic; Spanish speaking versus non-Spanish speaking). As is common in qualitative approaches, the researcher simultaneously collects and interprets data to help focus the general research question initially posed.

Throughout data collection, the ethnographic researcher identifies recurrent themes, integrates them into existing categories, and adds new categories as new themes or topics arise. The success of the study relies heavily on the researcher's skills in analyzing and synthesizing the qualitative data into coherent and meaningful descriptions. The research report includes a holistic description of the culture, the common understandings and beliefs shared by participants, a discussion of how these beliefs relate to life in the culture, and discussion of how the findings compare to literature already published about similar groups. In a sense, the successful researcher provides guidelines that enable someone not in the culture to know how to think and behave in the culture. Ethnographic research is described in detail in Chapter 13.

Case Study Research

Case study research is a qualitative research approach to conducting research on a unit of study or bounded system (e.g., an individual teacher, a classroom, or a school can be a case). Case study

research is an all-encompassing method covering design, data collection techniques, and specific approaches to data analysis.⁸ A case study is also the name for the product of case study research, which is different from other field-oriented research approaches such as narrative research and ethnographic research.

Following is an example of a study that used the case study research approach:

Mills (1988)⁹ asked, “How do central office personnel, principals, and teachers manage and cope with multiple innovations?” and studied educational change in one American school district. Mills described and analyzed how change functioned and what functions it served in this district. The function of change was viewed from the perspectives of central office personnel (e.g., superintendent, director of research and evaluation, program coordinators), principals, and teachers as they coped with and managed multiple innovations, including the introduction of kindergartens to elementary schools, the continuation of a program for at-risk students, and the use of the California Achievement Test (CAT) scores to drive school improvement efforts. Mills used qualitative data collection techniques including participant observation, interviewing, written sources of data, and nonwritten sources of data.

Case study research is described in detail in Chapter 14.

CLASSIFICATION OF RESEARCH BY PURPOSE

Research designs can also be classified by the degree of direct applicability of the research to educational practice or settings. When purpose is the classification criterion, all research studies fall into one of two categories: basic research and applied research. Applied research can be subdivided into evaluation research, research and development (R&D), and action research.

⁸ Yin, R. K. (2014). *Case Study Research: Design and Methods* (5th ed.). Thousand Oaks, CA: Sage.

⁹ Mills, G. E. (1988). *Managing and Coping with Multiple Educational Changes: A Case Study*. Unpublished doctoral dissertation, University of Oregon, Eugene.

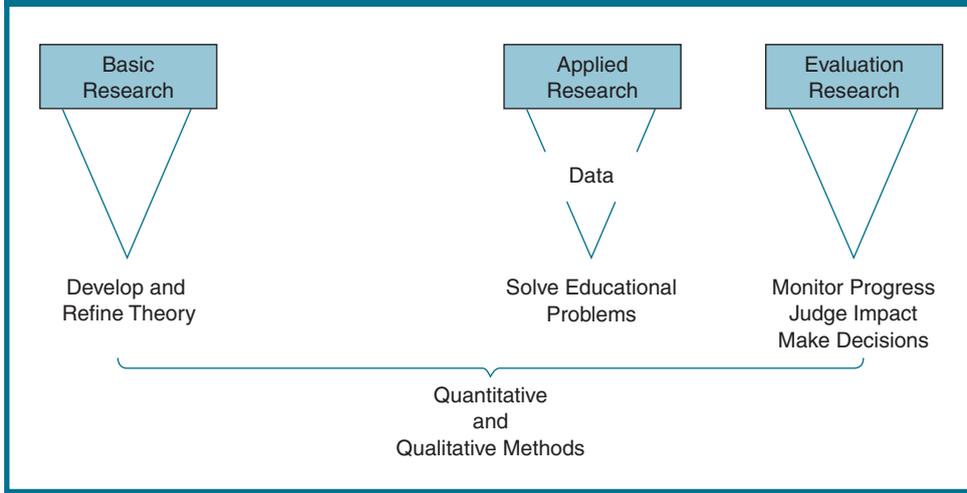
Basic and Applied Research

It is difficult to discuss basic and applied research separately because they are on a single continuum. In its purest form, **basic research** is conducted solely for the purpose of developing or refining a theory. Theory development is a conceptual process that requires many research studies conducted over time. Basic researchers may not be concerned with the immediate utility of their findings because it may be years before basic research leads to a practical educational application. For example, one of the articles listed at the end of this chapter focuses on basic research to develop and refine theories of children’s adaptation to new school settings (Hamre & Pianta, 2005).

Applied research, as the name implies, is conducted for the purpose of applying or testing a theory to determine its usefulness in solving practical problems. A teacher who asks, “Will the theory of multiple intelligences help improve my students’ learning?” is seeking an answer to a practical classroom question. This teacher is not interested in building a new theory or even generalizing beyond her classroom; instead, she is seeking specific helpful information about the impact of a promising practice (i.e., a teaching strategy based on the theory of multiple intelligences) on student learning. For example, one of the articles listed at the end of this chapter focuses on how a beginning teacher integrates university coursework on multicultural education into her classroom teaching and the decision-making process related to the implementation of a multicultural curriculum (Sleeter, 2009).

Educators and researchers sometimes disagree about which end of the basic–applied research continuum should be emphasized. Many educational research studies are located on the applied end of the continuum; they are more focused on what works best than on finding out why it works as it does. However, both basic research and applied research are necessary. Basic research provides the theory that produces the concepts for solving educational problems. Applied research provides data that can help support, guide, and revise the development of theory. Studies located in the middle of the basic–applied continuum seek to integrate both purposes. Figure 1.2 illustrates the educational research continuum.

FIGURE 1.2 • The educational research continuum



Evaluation Research

At the applied end of the research continuum is evaluation research, an important, widely used, and explicitly practical form of research. **Evaluation research** is the systematic process of collecting and analyzing data about the quality, effectiveness, merit, or value of programs, products, or practices. Unlike other forms of research that seek new knowledge or understanding, evaluation research focuses mainly on making decisions—decisions about those programs, products, and practices. For example, following evaluation, administrators may decide to continue a program or to abandon it, to adopt a new curriculum or to keep the current one. Some typical evaluation research questions are “Is this special science program worth its costs?” “Is the new reading curriculum better than the old one?” “Did students reach the objectives of the diversity sensitivity program?” and “Is the new geography curriculum meeting the teachers’ needs?”

Evaluations come in various forms and serve different functions.¹⁰ An evaluation may be either

formative or summative, for example. Formative evaluation occurs during the design phase when a program or product is under development and is conducted during implementation so that weaknesses can be remedied. Summative evaluation focuses on the overall quality or worth of a completed program or product.

Research and Development (R&D)

Research and development (R&D) is the process of researching consumer needs and then developing products to fulfill those needs. The purpose of R&D efforts in education is not to formulate or test theory but to develop effective products for use in schools. Such products include teacher-training materials, learning materials, sets of behavioral objectives, media materials, and management systems. R&D efforts are generally quite extensive in terms of objectives, personnel, and time to completion. Products are developed according to detailed specifications. Once completed, products are field-tested and revised until a prespecified level of effectiveness is achieved. Although the R&D cycle is expensive, it results in quality products designed to meet specific educational needs. School personnel who are the consumers of R&D endeavors may, for the first time, really see the value of educational research.

¹⁰ See *Evaluation Models: Viewpoints on Educational and Human Services Evaluation*, by D. Stufflebeam, G. Madaus, and T. Kellaghan, 2000, Norwell, MA: Kluwer Academic; *Program Evaluation*, by M. Gridler, 1996, Upper Saddle River, NJ: Prentice Hall; *The Program Evaluation Standards: How to Assess Evaluation of Education Programs* (2nd ed.), by Joint Committee on Standards for Educational Evaluation, 1994, Thousand Oaks, CA: Sage.

Action Research

Action research in education is any systematic inquiry conducted by teachers, principals, school counselors, or other stakeholders in the teaching–learning environment to gather information about the ways in which their particular schools operate, the teachers teach, and the students learn. Its purpose is to provide teacher-researchers with a method for solving everyday problems in their own settings. Because the research is not characterized by the same kind of control evident in other categories of research, however, study results cannot be applied to other settings. The primary goal of action research is the solution of a given problem, not contribution to science. Whether the research is conducted in one classroom or in many classrooms, the teacher is very much a part of the process. The more research training the teachers have had, the more likely it is that the research will produce valid results. Action research can use quantitative, qualitative, or mixed methods research designs depending on the nature of the research problem.

Following are examples of action research:

- *A study to determine how mathematics problem-solving strategies are integrated into student learning and transferred to real-life settings outside the classroom.* An elementary teacher conducts the study in his own school.
- *A study on how a school grading policy change affects student learning.* A team of high school teachers works collaboratively to determine how replacing number and letter grades with narrative feedback affects student learning and attitudes toward learning.

The value of action research is confined primarily to those conducting it. Despite this limitation, action research represents a scientific approach to problem solving that is considerably better than change based on the alleged effectiveness of untried procedures and infinitely better than no change at all. It is a means by which concerned school personnel can attempt to improve the educational process, at least within their environment. Action research is described in detail in Chapter 16.

ENHANCEDetext *Self-Check*

THE ETHICS OF EDUCATIONAL RESEARCH

Ethical considerations play a role in all research studies, and all researchers must be aware of and attend to the ethical considerations related to their studies. In research, the ends do not justify the means, and researchers must not put the need or desire to carry out a study above the responsibility to maintain the well-being of the study participants. Research studies are built on trust between the researcher and the participants, and researchers have a responsibility to behave in a trustworthy manner, just as they expect participants to behave in the same manner (e.g., by providing responses that can be trusted). The two overriding rules of ethics are that participants should not be harmed in any way—physically, mentally, or socially—and that researchers obtain the participants' informed consent, as discussed in the following sections.

To remind researchers of their responsibilities, professional organizations have developed codes of ethical conduct for their members. The general principles from the Ethical Principles of Psychologists and Code of Conduct adopted by the American Psychological Association (June 1, 2010) provides guidelines and contains specific ethical standards in 10 categories, which are not limited to research: (1) Resolving Ethical Issues, (2) Competence, (3) Human Relations, (4) Privacy and Confidentiality, (5) Advertising and Other Public Statements, (6) Record Keeping and Fees, (7) Education and Training, (8) Research and Publication, (9) Assessment, and (10) Therapy. You may read the full text online at the website for the American Psychological Association (apa.org).

The American Educational Research Association (AERA) approved a code of ethics in February 2011 (for a comprehensive discussion see *Educational Researcher*, 40[3], 145–156). The code of ethics of AERA outlines a set of values on which educational researchers should build their research practices. Included in the code of ethics are five principles and 22 ethical standards. The principles are intended to serve as a guide for education researchers in determining ethical behavior in various contexts and include: (a) Professional Competence; (b) Integrity; (c) Professional, Scientific, and Scholarly

Responsibility; (d) Respect for People’s Rights, Dignity, and Diversity; and (e) Social Responsibility. The 22 ethical standards set forth the rules for ethical conduct by education researchers and, while not intended to be an exhaustive list, aims to cover most situations encountered by education researchers. The list is as follows:

1. Scientific, Scholarly, and Professional Standards
2. Competence
3. Use and Misuse of Expertise
4. Fabrication, Falsification, and Plagiarism
5. Avoiding Harm
6. Nondiscrimination
7. Nonexploitation
8. Harassment
9. Employment Decisions
10. Conflicts of Interest
11. Public Communications
12. Confidentiality
13. Informed Consent
14. Research Planning, Implementation, and Dissemination
15. Authorship Credit
16. Publication Process
17. Responsibilities of Reviewers
18. Teaching, Training, and Administering Education Programs
19. Mentoring
20. Supervision
21. Contractual and Consulting Services
22. Adherence to the Ethical Standards of the American Educational Research Association

Of particular importance is the ethical standard of informed consent, and AERA provides considerable guidance for how and when informed consent with children should be sought (cf. pp. 151–152). This will be discussed further in the section on ethical guidelines. Educational researchers should consider membership in the American Educational Research Association; membership information and benefits can be found at aera.net.

The similarity among the ethical codes is not coincidental; they are based in the same history. In 1974, the U.S. Congress passed the **National Research Act of 1974**, which authorized the creation of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. This commission was

charged with developing an ethical code and guidelines for researchers. The need for a standard set of guidelines was prompted by a number of studies in which researchers lied to research participants or put them in harm’s way to carry out their studies. For example, in a study on the effects of group pressure conducted in the 1960s, researchers lied to participants, telling them to apply high levels of electric shock to another (unseen) person who was apparently in agony, although no shock was really applied and the unseen person was simply pretending.¹¹ In another study lasting four decades, men known to be infected with syphilis were not treated for their illness because they were part of a control group in a comparative study.¹²

Today, these types of studies would not be federally funded and could not be conducted at universities, research institutes, and medical centers that adhere to the current ethical guidelines. Most hospitals, colleges, and universities have a review group, usually called the Human Subjects Review Committee (HSRC) or Institutional Review Board (IRB). This board should consist of at least five members, not all of one gender; include one nonscientist; and include at least one member who is mainly concerned with the welfare of the participants. People who may have a conflict of interest (e.g., the researcher of a particular study, a member of the funding organization) are excluded.

Typically, a researcher must submit a proposal to the chair of the board, who distributes copies to all members. The members, separately and individually, evaluate the proposed treatment of participants and then meet as a group to discuss their evaluations. If any question arises as to whether participants may be harmed in any way, the review group meets with the researcher to clarify the procedures and purposes of the study. When the review group is satisfied that participants will not be placed at risk or that potential risk will be minimal compared to the potential benefits of the study, the committee members

¹¹ “Group Pressure and Action Against a Person,” by S. Milgram, 1964, *Journal of Abnormal and Social Psychology*, 69, 137–143.

¹² *The Tuskegee Syphilis Experiment*, by J. H. Jones, 1998, New York: Free Press.

sign the approval forms, signifying that the proposal is acceptable with respect to participant protection. We recommend that you contact the IRB at your institution to learn its guidelines for the protection of human subjects. You should obtain any forms required for research with humans and consider how you would complete the paperwork given the ethical guidelines presented in this chapter.

Informed Consent and Protection from Harm

Perhaps the most basic and important ethical issues in research are concerned with protection of participants, broadly defined, which requires that research participants not be harmed in any way (i.e., physically, mentally, or socially) and that they participate only if they freely agree to do so (i.e., give informed consent).

Researchers obtain *informed consent* by making sure that research participants enter the research of their free will and with understanding of the nature of the study and any possible dangers that may arise as a result of participation. This requirement is intended to reduce the likelihood that participants will be exploited by a researcher persuading them to participate when they do not fully know the requirements of the study. Participants who are not of legal age or are not mentally capable cannot give informed consent; in these cases, permission must be given by parents or legal guardians. Even if permission is granted from a guardian, all participants still retain the right to decline to participate—the researcher must provide to each participant, in language appropriate to the individual's developmental level, basic information about the task, and the participant must agree to participate.

Researchers ensure *freedom from harm* first by not exposing participants to undue risks. This requirement involves issues related to personal privacy and confidentiality (i.e., protecting participants from embarrassment or ridicule). Collecting information about participants or observing them without their knowledge or without appropriate permission is not ethical. Furthermore, any information or data that are collected, either from or about a person, should be strictly confidential, especially if it is personal. In other words,

access to data should be limited to people directly involved in conducting the research. An individual participant's performance should not be reported or made public using the participant's name, even for a seemingly innocuous measure such as an arithmetic test.

The use of anonymity to ensure confidentiality and avoid privacy invasion and potential harm is common. Study participants have complete **anonymity** when their identities are kept hidden from the researcher. It is often confused with **confidentiality**; researchers protect confidentiality when they know the identities of study participants but do not disclose that information. If the researcher knows participants' identities, the participants should be assured of confidentiality but not anonymity. Removing names from data sheets or coding records is one common way to maintain anonymity. When planning a study, researchers tell participants whether they will provide confidentiality (i.e., the researcher knows but won't tell) or anonymity (i.e., researcher will not know the participants' names); good researchers make sure they know the difference. Sometimes researchers seek access to data from a previous study to examine new questions based on the old data. In such cases, the original researcher has the responsibility to maintain the confidentiality or anonymity promised the participants of the original study.

When research is conducted in the classroom, concerns about confidentiality and anonymity are frequently raised. The **Family Educational Rights and Privacy Act of 1974**, usually referred to as the Buckley Amendment, was designed to protect the privacy of students' educational records. Among its provisions is the specification that data that identify a student may not be made available unless written permission is acquired from the student (if of legal age) or a parent or legal guardian. The permission form must indicate what data may be disclosed, for what purposes, and to whom. If a study requires obtaining information from individual elementary students' school record files, the researcher must obtain written permission from each student's parent or guardian, not a blanket approval from the school principal or classroom teacher. In contrast, researchers interested in using class averages (in which no individual student was identified) can

usually seek permission only from the principal. However, if a researcher planned to calculate the class average him- or herself by using information provided in individual student records, permission from each student is required.

There are some exceptions to this requirement for written consent. For example, school personnel with a legitimate educational interest in a student would not need written consent to examine student records (e.g., a teacher conducting action research in his or her own classroom). In other cases, the researcher could request that a teacher or guidance counselor either remove names from students' records completely or replace them with a coded number or letter. The researcher could then use the records without knowing the names of the individual students.

Deception

Another ethical dilemma occurs when a researcher poses a topic that, if disclosed completely to potential participants, would likely influence or change their responses. For example, studies concerned with participants' racial, gender, cultural, or medical orientation or attitudes are especially susceptible to such influences, and researchers often hide the true nature of the topic of study. As another example, research on how teachers interact with students may be affected if the teachers know the aim of the study and change their normal behaviors as a result. When deception occurs, participants cannot truly give informed consent.

This type of deception is a form of lying, and studies in which the researcher plans to deceive participants must be carefully scrutinized on ethical grounds. Some researchers believe that any study that requires deceitful practice should not be carried out. Others recognize that some important studies cannot be undertaken without deception. We recommend that you do your initial research studies on topics that do not require deception. If you choose a topic that involves deception, your adviser and the HSRC or IRB at your institution will provide suggestions for ethical ways to carry out your research plan. Remember that all researchers, even student-researchers, are responsible for maintaining ethical standards in the research.

Ethical Issues Unique to Qualitative Research

The ethical issues and responsibilities discussed thus far pertain to both quantitative and qualitative research plans. However, some features of qualitative research raise additional issues not typically encountered in quantitative research.

Qualitative research differs from quantitative research in at least two major ways that produce additional ethical concerns. First, qualitative research plans typically evolve and change as the researcher's immersion in and understanding of the research setting grow. In a real sense, the research plan is only generally formed when presented to the IRB. As the plan evolves with added understanding of the context and participants, unanticipated and unreviewed ethical issues can arise and need to be resolved on the spot. For example, as participants become more comfortable with the researcher, they often ask to see what has been written about them. They feel entitled to this information, even though seeing what has been written may cause personal distress for them or data collection problems for the researcher. Second, qualitative researchers typically are personally engaged in the research context. Interviews, observations, and debriefings bring the researcher and participants in close, personal contact. The closeness between participants and researcher helps to provide deep and rich data, but it may also create unintended influences on objectivity and data interpretation.

The focus on immersion and detailed knowledge of the research context, more common in qualitative than quantitative research, may result in the researcher observing behavior that may otherwise be hidden, such as illegal or unprofessional activities. The qualitative researcher may observe theft, emotional cruelty and ridicule, or narcotics use, for example. In these and other similar situations, the researcher must make a choice—report the observations, knowing that to do so likely will end the study because participants will no longer be certain of the researcher's promise of confidentiality, or keep silent on the assumption that the system will eventually identify and correct the problems. In educational research, if the researcher perceives physical or psychological danger, he or she has a strong mandate to inform the school authorities.

Unfortunately, not all situations present ethically clear actions. To respond appropriately and to make ethical decisions, qualitative researchers must ensure that their professional ethical perspectives are closely aligned with their personal ethical perspectives. This statement may seem obvious, except for this caveat: Qualitative researchers may find themselves in situations that require an immediate response—the very essence of which may threaten the success of the research. If your personal and research ethical perspectives are aligned, you will in all likelihood respond to ethical challenges in an appropriate, professional fashion that will not threaten the ongoing conduct of your research.

Considering ethics before commencing qualitative research is one way to ensure that you will be prepared to respond in an ethical, caring manner if difficult situations arise. The role of ethics in qualitative research can be considered in terms of how we treat the individuals with whom we interact in research settings. The nature of the qualitative research enterprise provides the potential for conflict and harm, and it is critical that everyone involved has a clear understanding of the intimate and open-ended nature of the research process so that participants are not injured in the name of research.

To summarize, qualitative research is intimate because there is little distance between researchers and their study participants. Qualitative research is open-ended because the direction of the research often unfolds during the course of the study. As a result, qualitative researchers often cannot obtain participants' informed consent, the principle that seeks to ensure that all human research participants retain autonomy and the ability to judge for themselves whether risks are worth taking for the purpose of furthering scientific knowledge.

The following commonsense ethical guideposts, adapted from Smith,¹³ may help qualitative researchers respond appropriately when faced with ethical decisions before, during, and after a qualitative research inquiry.

A researcher should have an ethical perspective with regard to the research that is very close to his or her personal ethical position. Qualitative researchers may find themselves in situations that seem foreign. For example, consider a collaborative action research project focused on how a new math problem-solving curriculum affects student achievement and attitude. Teachers distribute student attitude surveys in their classrooms, which are later analyzed by a team of teacher-researchers representing different grades in the school. During the analysis, it becomes clear that students in one of the groups are very unhappy with their math instruction and have supported their assertions with negative comments about the teacher. What will you do with the data? Should they be shared in an unedited form with the teacher? Who stands to be hurt in the process? What potential good can come from sharing the data? What assurances of confidentiality were given to the participants before collecting the data?

This scenario is not meant to scare you away from doing qualitative research but rather to illustrate the unexpected outcomes that occasionally face qualitative researchers. Smith's guidepost is an important one. You will more likely avoid such awkward situations if you clarify your ethical perspectives at the outset. A values clarification activity that can be undertaken individually or collectively may be helpful. It is worthwhile to reflect on how you would want to be treated as a participant in a research study. How would you feel if you were deceived by the researchers? What action would you take? How can you prevent research participants from feeling exploited? Again, there are no simple answers to these ethical questions. The point is this: Be prepared to respond in a manner that is comfortable and natural for you.

Informed consent should take the form of a dialogue that mutually shapes the research and the results. Be clear about whether you need to seek permission from participants in the study by discussing the research project with a school administrator or central office person who can describe instances that require written permission, and check the requirements of your IRB. For example, if you are collecting

¹³ "Ethics in Qualitative Field Research," by L. M. Smith, 1990, in *Qualitative Inquiry in Education: The Continuing Debate*, by E. W. Eisner and A. P. Peshkin (Eds.), New York: Teachers College Press.

photographs or video-recordings as data and intend to use these artifacts in a public forum, such as a presentation at a conference, make sure that you know whether written permission is necessary.

Thinking about the relation between confidentiality and informed consent helps to clarify some of these issues. Confidentiality is important for protecting research informants from stress, embarrassment, or unwanted publicity as well as for protecting participants should they reveal something to a researcher that could be used against them by others interested in the outcomes of the research. In some qualitative research efforts, assigning pseudonyms to conceal identities is not enough because other details can lead to identification of the individuals or specific research settings. Researchers must consider whether participants would have consented to the study had they known about the type of data collected and the way in which results would be distributed, and they must take steps to ensure that participants' right to privacy is not violated. Informed consent should take the form of an ongoing dialogue that shapes the research and the results.

Researchers should also think beyond the methods they plan to use; they must identify broader social principles that are integral parts of who they are as researchers and as contributing members of the communities in which they live. These broader social principles dictate one's ethical stance. For example, democratic processes, social justice, equality, and emancipation may be the principles that guide ethical behavior in a given situation.

Qualitative researchers are morally bound to conduct their research in a manner that minimizes potential harm to those involved in the study. A broader view of this concept suggests that qualitative researchers need to convey with confidence that research participants will not suffer harm as the result of their involvement in the research effort.

Even though an action may bring about good results, it is not ethical unless that action also conforms to ethical standards such as honesty and justice. From this perspective, acting

ethically may be viewed in terms of doing unto others as you would have them do unto you. For example, it is unethical to treat participants as research pawns or as means to an end.

*The qualitative researcher must remain attentive to the relationship between the researcher and the participants, a relationship determined by "roles, status, language, and cultural norms."*¹⁴ The lesson for qualitative researchers who are proponents of this perspective is to pay attention to the research processes of giving information, reciprocity, and collaboration and to be sensitive to how these processes are viewed by other participants in the research. Again, this perspective forces us to confront the socially responsive characteristics of our research efforts as being democratic, equitable, liberating, and life-enhancing.

The purpose of this discussion on ethics in qualitative research has been to prepare you to think about a range of issues that face any researcher. Carefully consider how you will respond when confronted with difficult questions from colleagues, parents, students, and administrators. Taking time to clarify your values and ethical perspectives will help you respond in a professional, personal, and caring fashion.

As you embark on your qualitative research journey, remember that, in matters of ethics, there are few absolutes. Working through issues related to confidentiality, anonymity, informed consent, and rational judgment before you begin will help you to avoid or resolve potentially difficult situations that may arise in implementing a qualitative research effort. See Figure 1.3 for a summary of ethical guidelines for qualitative researchers.

The sources and advice noted in this chapter will help you conceive and conduct ethical studies. The suggestions do not cover all the ethical issues you are likely to encounter in your research. Perhaps the fundamental ethical rule is that participants should not be harmed in any way, real or possible, in the name of science. Respect and concern for your own integrity and for your participants' dignity and welfare are the bottom lines of ethical research.

¹⁴ "In Search of Ethical Guidance: Constructing a Basis for Dialogue," by D. J. Flinders, 1992, *Qualitative Studies in Education*, 5(2), p. 108.

FIGURE 1.3 • Ethical guidelines for qualitative researchers

- _____ Develop an ethical perspective that is close to your personal ethical position.
- _____ Seek research participants' informed consent.
- _____ Determine the broader social principles that affect your ethical stance.
- _____ Consider confidentiality to avoid harm.
- _____ There is no room for deception!

Source: Mills, Geoffrey, *Action Research: A Guide for the Teacher Researcher*, 5th Edition, © 2014. Reprinted by permission of Pearson Education, Inc., Upper Saddle River, NJ.

Gaining Entry to the Research Site

Very rarely is it possible to conduct educational research without the cooperation of other people. An initial step in acquiring the needed cooperation is to identify and follow required procedures for gaining approval to conduct the study in the chosen site. In schools, research approval is usually granted by the superintendent, school board, or some other high-level administrator, such as the associate superintendent for instruction. In other settings, such as hospitals or industry, an individual or a committee is typically charged with examining and then approving or denying requests to do research at the site. Regardless of the site, the researcher must complete one or more forms that describe the nature of the research, the specific request being made of the site personnel, and the benefits to the site. Before the request is approved, the researcher may need to obtain permission from others as well; for example, a superintendent or school board may require that permission be granted from the principal or principals whose schools will be involved. Even if such approval is not required, it should be sought, both as a courtesy and for the sake of a smoothly executed study. Of course, as discussed earlier, all participants must agree to be part of the study. Depending on the nature of the study, permission, or at least acceptance, should be obtained from the teachers who will participate in the study. If students under age 18 are to be involved, written parental permission will be needed.

Given the potential complexity of obtaining permission to conduct your research at the chosen site or sites, you should not assume that permission will be granted easily (e.g., often researchers hear, “we’re too busy”) or quickly (i.e., bureaucracies move slowly). Thus, you should think carefully about how to explain your study to all those who must provide permission and approval. The key to gaining approval and cooperation is good planning, and the key to good planning is a well-designed, carefully thought-out study and research plan. Some superintendents and principals are hesitant about research in their schools because of previous bad experiences. They don’t want anyone else running around their schools, disrupting classes, administering poorly constructed questionnaires, or finding problems. It is up to you to convince school personnel that what you are proposing is of value, that your study is carefully designed, and that you will work with teachers to minimize inconvenience.

Achieving full cooperation, beyond approval on paper, requires that you invest as much time as is necessary to discuss your study with the principals, the teachers, and perhaps even parents. These groups have varying levels of knowledge and understanding regarding the research process. Their concerns will focus mainly on the perceived value of the study, its potential impact on participants, and the logistics of carrying it out. The principal, for example, will probably be more concerned with whether you are collecting any data that may be viewed as objectionable by the community than with the specific design you will be using. All groups will be interested in what you may be able to do for them. You should fully explain any potential benefits to the students, teachers, or principals as a result of your study. Your study, for example, may involve special instructional materials that are given to the teachers after the data collection ends. Even if all parties are favorably impressed, however, the spirit of cooperation will quickly dwindle if your study involves considerable extra work or inconvenience on their part. Bear in mind that principals and teachers are accommodating you; they are helping you complete your study without relief from their normal responsibilities. If asked, you should make any changes you can in the study to better preserve participants’ normal routines, as long as you do not adversely affect your work or its results. No

change should be made solely for the sake of the compromise without considering its impact on the study as a whole.

It is not unusual for principals or teachers to want something in return for their participation. The request may be related to your study, as when a principal asks to review your final report for accuracy, asks you to return to the school to describe your findings to teachers, or requests that your results not be disseminated without the principal's approval. The first two requests are more

easily agreed to than the third, which probably should be refused in favor of an offer to discuss the principal's concerns, if any. It is also common for principals to ask the researcher to provide a session or two of professional development for teachers in the school.

Figure 1.4 presents a letter written by a principal to inform parents of a doctoral student's proposed study. The doctoral student appears to have shared the potential benefits of the study with the principal and, as a result, secured not only the

FIGURE 1.4 • Principal's letter to parents concerning a proposed research study

THE SCHOOL BOARD OF KNOX COUNTY, MASSACHUSETTS

Oak Street Elementary School
Gwen Gregory, Principal
113 Oak Street
Clover, Massachusetts
555-555-5555

January 23, 2005

Dear Parent/Guardian:

Oak Street Elementary School has been chosen to participate in a research study. Our school was selected out of the entire country as a result of our outstanding students and computer program. All third- and fifth-grade students will be able to participate. The results of this study will enable our teachers and parents to discover and understand the learning styles of our students. This knowledge will enable teachers and parents to provide special instruction and materials to improve student learning. It will also provide valuable information for the future development of effective professional computer software.

This study will take place from January 29 to March 30, 2005. It will be conducted by Mrs. Joleen Levine, a recognized and experienced computer educator. She has been Director of Computer Education at Northern University for six years. During that time she has participated in many projects in Knox County that involved teacher training, computer curriculum development, and computer assisted instruction implementation.

I have reviewed this research study and feel that it is a very worthwhile endeavor for our students and school. Please review the information on the following page in order to make a decision concerning permission consent for your child to participate in this study.

Sincerely,



Gwen Gregory
Principal

principal's permission but also her strong support and cooperation. The parental permission form that accompanied the letter, shown in Figure 1.5, addresses many of the ethical and legal concerns discussed in this chapter.

Clearly, human relations are an important factor in conducting research in applied settings.

That you should be your usual charming self goes without saying, but you should keep in mind that you are dealing with sincere, concerned educators who may not have your level of research expertise. Therefore, you must make a special effort to discuss your study in plain English (it is possible!) and never give school personnel the impression

FIGURE 1.5 • Parental permission form for a proposed research study

PARENTAL PERMISSION FORM

The information provided on this form and the accompanying cover letter is presented to you in order to fulfill legal and ethical requirements for Northwest Eaton College (the institution sponsoring this doctoral dissertation study) and the Department of Health and Human Services (HHS) regulations for the Protection of Human Research Subjects as amended on March 26, 1989. The wording used in this form is utilized for all types of studies and should not be misinterpreted for this particular study.

The dissertation committee at Northern University and the Research Review Committee of Knox County Public Schools have both given approval to conduct this study, "The Relationships Between the Modality Preferences of Elementary Students and Selected Instructional Styles of CAI as They Affect Verbal Learning of Facts." The purpose of this study is to determine the effect on achievement scores when the identified learning styles (visual, audio, tactile/kinesthetic) of elementary students in grades 3 and 5 are matched or mismatched to the instructional methods of specifically selected computer assisted instruction (CAI).

Your child will be involved in this study by way of the following:

1. Pretest on animal facts.
2. Posttest on animal facts.
3. Test on learning styles.
4. Interaction with computer-assisted instruction (CAI-software on the computer)—visual, audio, tactile CAI matching the student's own learning style.

All of these activities should not take more than two hours per student. There are no foreseeable risks to the students involved. In addition, the parent or researcher may remove the student from the study at any time with just cause. Specific information about individual students will be kept *strictly confidential* and will be obtainable from the school principal if desired. The results that are published publicly will not reference any individual students since the study will only analyze relationships among groups of data.

The purpose of this form is to allow your child to participate in the study, and to allow the researcher to use the information already available at the school or information obtained from the actual study to analyze the outcomes of the study. Parental consent for this research study is strictly voluntary without undue influence or penalty. The parent signature below also assumes that the child understands and agrees to participate cooperatively.

If you have additional questions regarding the study, the rights of subjects, or potential problems, please call the principal, Ms. Gwen Gregory, or the researcher, Ms. Joleen Levine (Director of Computer Education, Northern University, 555-5554).

Student's Name

Signature of Parent/Guardian

Date

that you are talking down to them. Also, your task is not over once the study begins. The feelings of involved persons must be monitored and responded to throughout the duration of the study if the initial level of cooperation is to be maintained.

This chapter has provided a general introduction to fundamental aspects of the scientific method, along with examples of both quantitative and qualitative approaches. Included are overviews

of educational research methods, research purposes, and the ethical dilemmas faced by educational researchers. If the number of new terms and definitions seems overwhelming, remember that most will be revisited and reviewed in succeeding chapters. In those chapters we present more specific and detailed features needed to carry out, understand, and conduct useful educational research.

ENHANCEDetext *Self-Check*

WRITE LIKE A RESEARCHER!

Sometimes educational researchers are criticized for being incredibly boring, especially in the way they write about their research (not engaging like this textbook!). After all, while the content of our research is perhaps far more “black and white” than E. L. James’s *Fifty Shades of Grey*, perhaps it is still possible to write in a style that is consistent with meeting the requirements of the scientific method while still being engaging for our readers. After all, how many of us can claim that we have recently completed a real “page turner” of a research paper?! Like some of the pages of this text, I suspect that we ultimately find ourselves trapped with the writing conventions of the academy, but I encourage you not to give up the goal of writing about your research in an engaging fashion.

If we look at the characteristics of the scientific method presented in this chapter, we can start to think about writing an initial research narrative that includes the following four sections and compare what we may write with what the authors of the research articles at the end of this chapter have written:

1. *Selection and definition of a problem.*

A problem is a question of interest that can be tested or answered through the collection and analysis of data.

- “The current study was designed to extend work related to school effects by following children identified in kindergarten as being at risk of school failure and examining whether the classroom environment to which they were exposed during the first grade moderated these risks by the end of the first grade” (Hamre & Pianta).

- “To examine the relationship between a teacher’s learning and my teaching strategies in the university” (Sleeter)
2. *Execution of research procedures.* The procedures reflect all the activities involved in collecting data related to the problem (e.g., how data are collected and from whom).

- “Children included in this study took part in the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care. The children’s mothers were recruited from hospitals located in or near Little Rock, AK; Irvine, CA; Lawrence, KS; Boston, MA; Philadelphia, PA; Pittsburgh, PA; Charlottesville, VA; Morganton, NC; Seattle, WA; and Madison, WI. In 1991, research staff visited 8,986 mothers giving birth in these hospitals. Of these mothers, 5,416 met eligibility criteria and agreed to be contacted after returning home from the hospital. A randomly selected subgroup (with procedures to ensure economic, educational, and ethnic diversity) were contacted and enrolled in the study. This resulted in a sample of 1,364 families with healthy newborns. Details of this selection procedure are published in the study manuals (NICHD ECCRN, 1993)” (Hamre & Pianta).

- “Case study research typically uses a variety of methods to collect data, with an objective toward triangulating findings across methods (Creswell, 2008; Stake, 2000). Data for this study included (1) several papers that Ann completed during the

(continued)

course, including a unit that she designed as a course requirement; (2) a journal that I kept after each class session; (3) notes on two observations of Ann teaching the unit that she designed after the course had ended; and (4) a 40-minute recorded interview with Ann following my observations” (Sleeter).

3. *Analysis of data.* Data are analyzed in a way that permits the researcher to test the research hypothesis or answer the research question.

- “In order to establish whether instructional and emotional support in the first grade may moderate risk, we first had to establish two preconditions: (1) the existence of a natural experiment, in which children with varying risk backgrounds in kindergarten would sort into first-grade classrooms offering different levels of emotional and instructional support, and (2) whether the hypothesized risk factors were associated with poorer outcomes in first grade. The first precondition was assessed through examining the distribution of children in each risk group into classrooms offering high, moderate, and low support. The second precondition was assessed by conducting ANCOVAs in which risk status was used to predict first-grade outcomes, after adjusting for children’s previous performance on these outcomes measures” (Hamre & Pianta).
- “Early in the semester (September), I guided teachers in analyzing epistemological assumptions in various documents related to curriculum, such as curriculum standards and school reform proposals available on the Internet. Teachers examined documents in relationship to questions such as the following: *Who produced this document (if it is possible to tell)? How is it intended to be used? By whom? What is its purpose? Whose view of the world does it support? Whose view does it undermine or ignore? Whose*

knowledge isn’t here? In addition, they analyzed textbooks from their classrooms, with guidance from a textbook analysis instrument” (Sleeter).

4. *Drawing and stating conclusions.* The conclusions, which should advance our general knowledge of the topic in question, are based on the results of data analysis.

- “The study provides evidence that across two important domains of child functioning in the early grades of school, achievement, and relationships with teachers, the quality of everyday classroom interactions in the form of instructional and emotional support moderates the risk of early school failure” (Hamre & Pianta).
- “This case study showed how one novice teacher began to question institutionalized assumptions in the context of a graduate course and how she began to think more complexly. The case study reinforced for me the importance of creating contexts in which teachers can examine their own backgrounds and beliefs, interact with one another, and interact with ideas that stretch them intellectually. Of course, no two teachers bring the same prior experiences, beliefs, and commitments. The challenge for an instructor lies in planning a course that activates a variety of experiences and enables uncomfortable questions and disagreements to take place so that teachers can grow. This inquiry into learning has helped me make sense of that challenge” (Sleeter).

Are there characteristics of each of these papers that you find engaging? If so, what are they and how might they find their way into your own writing about your research? Are you up to the challenge? Chapter 21 contains considerable details about guidelines for writing a research report, and formats and styles for theses, dissertations, and journal articles.

SUMMARY

THE SCIENTIFIC METHOD

1. The goal of all scientific endeavors is to describe, explain, predict, and/or control phenomena.
2. Compared to other sources of knowledge, such as experience, authority, inductive reasoning, and deductive reasoning, application of the scientific method is the most efficient and reliable.
3. The scientific method is an orderly process that entails recognition and definition of a problem, formulation of hypotheses, collection and analysis of data, and statement of conclusions regarding confirmation or disconfirmation of the hypotheses.

Limitations of the Scientific Method

4. Four main factors put limitations on the use of a scientific and disciplined inquiry approach: inability to answer some types of questions, inability to capture the full richness of the research site and the complexity of the participants, limitations of measuring instruments, and the need to address participants' needs in ethical and responsible ways.

Application of the Scientific Method in Education

5. Research is the formal, systematic application of the scientific method to the study of problems; educational research is the formal, systematic application of the scientific method to the study of educational problems.
6. The major difference between educational research and some other types of scientific research is the nature of the phenomena studied. It can be quite difficult to explain, predict, and control situations involving human beings, by far the most complex of all organisms.
7. The research process usually comprises four general steps:
 - a. Selection and definition of a problem
 - b. Execution of research procedures

- c. Analysis of data
- d. Drawing and stating conclusions

DIFFERENT APPROACHES TO EDUCATIONAL RESEARCH

The Continuum of Research Philosophies

8. Certain philosophical assumptions underpin an educational researcher's decision to conduct research. These philosophical assumptions address issues related to the nature of reality (ontology), how researchers know what they know (epistemology), and the methods used to study a particular phenomenon (methodology).

Quantitative Research

9. Quantitative research is the collection and analysis of numerical data to explain, predict, and/or control phenomena of interest.
10. Key features of quantitative research are hypotheses that predict the results of the research before the study begins; control of contextual factors that may influence the study; collection of data from sufficient samples of participants; and use of numerical, statistical approaches to analyze the collected data.
11. The quantitative approach assumes that the world is relatively stable, uniform, and coherent.

Qualitative Research

12. Qualitative research is the collection, analysis, and interpretation of comprehensive narrative and visual (nonnumeric) data to gain insights into a particular phenomenon of interest.
13. Key features of qualitative research include defining the problem, but not necessarily at the start of the study; studying contextual factors in the participants' natural settings; collecting data from a small number of purposely selected participants; and using nonnumeric, interpretive approaches

to provide narrative descriptions of the participants and their contexts.

14. An important belief that underlies qualitative research is that the world is not stable, coherent, or uniform, and therefore there are many truths.

Mixed Methods Research

15. Mixed methods research combines quantitative and qualitative approaches by including both quantitative and qualitative data in a single study. The purpose of mixed methods research is to build on the synergy and strength that exists between quantitative and qualitative research approaches to understand a phenomenon more fully than is possible using either quantitative or qualitative approaches alone.

Characteristics of Quantitative and Qualitative Research Approaches

16. Qualitative and quantitative researchers follow the same basic six steps in conducting research, although application of the steps may differ depending on the research design.

CLASSIFICATION OF RESEARCH BY DESIGN

Quantitative Approaches

17. Quantitative research approaches are intended to describe current conditions, investigate relations, and study cause–effect phenomena.
18. Survey research involves collecting numerical data to answer questions about the current status of the subject of study.
19. Correlational research examines the relation between two or more variables. A variable is a placeholder—such as age, IQ, or height—that can take on different values.
20. In correlational research, the degree of relation is measured by a correlation coefficient. If two variables are highly related, one is not necessarily the cause of the other.
21. Causal–comparative research seeks to investigate differences between two or more different programs, methods, or groups. The activity thought to make a difference (e.g., the program, method, or group) is called the grouping variable. The effect is called the dependent variable.

22. In most causal–comparative research studies, the researcher does not have control over the grouping variable because it already has occurred or cannot be manipulated. Causal–comparative research is useful in those circumstances when it is impossible or unethical to manipulate an independent variable.
23. True experimental research investigates causal relations among variables.
24. The experimental researcher controls the selection of participants by choosing them from a single pool and assigning them at random to different causal treatments. The researcher also controls contextual variables that may interfere with the study. Because participants are randomly selected and assigned to different treatments, experimental research permits researchers to make true cause–effect statements.
25. Single-subject experimental designs are a type of experimental research that can be applied when the sample is one individual or group. This type of design is often used to study the behavior change that an individual or group exhibits as a result of some intervention or treatment.

Qualitative Approaches

26. Qualitative approaches include narrative research, ethnographic research, and case study research. The focus of these methods is on deep description of aspects of people’s everyday perspectives and context.
27. Narrative research is the study of how individuals experience the world. The researcher typically focuses on a single person and gathers data through the collection of stories.
28. Ethnographic research is the study of the cultural patterns and perspectives of participants in their natural setting. Ethnography focuses on a particular site or sites that provide the researcher with a context in which to study both the setting and the participants who inhabit it.
29. Case study research is a qualitative research approach to conducting research on a unit of study or bounded system (e.g., classroom, school).

CLASSIFICATION OF RESEARCH BY PURPOSE

Basic and Applied Research

- 30.** Basic research is conducted to develop or refine theory, not to solve immediate practical problems. Applied research is conducted to find solutions to current practical problems.

Evaluation Research

- 31.** The purpose of evaluation research is to inform decision making about educational programs and practices.

Research & Development

- 32.** The major purpose of R&D efforts is to develop effective products for use in schools.

Action Research

- 33.** The purpose of action research is to provide teacher-researchers with a method for solving everyday problems in their own settings.

THE ETHICS OF EDUCATIONAL RESEARCH

- 34.** Ethical considerations play a role in all research studies, and all researchers must be aware of and attend to ethical considerations in their research.
- 35.** The two overriding rules of ethics are that participants should not be harmed in any way—physically, mentally, or socially—and that researchers must obtain the participants' informed consent.
- 36.** Professional organizations develop ethical principles for their members, and the federal government has enacted laws to protect research participants from harm and invasion of privacy.
- 37.** Probably the most definitive sources of ethical guidelines for researchers are the Ethical Principles of Psychologists and Code of Conduct adopted in 2010 by the American Psychological Association and the Code of Ethics approved by the American Educational Research Association in 2011.
- 38.** The National Research Act of 1974 led to the creation of a standard set of federal guidelines for the protection of human research participants.

- 39.** Most hospitals, colleges, and universities require that proposed research activities involving human participants be reviewed and approved by an IRB prior to the execution of the research, to ensure protection of the participants.

Informed Consent and Protection from Harm

- 40.** Researchers obtain informed consent by making sure that research participants enter the research of their free will and with understanding of the nature of the study and any possible dangers that may arise as a result of participation.
- 41.** Study participants are assured of confidentiality; researchers promise not to disclose participants' identities or information that could lead to discovery of those identities. Confidentiality differs from anonymity; the identities of anonymous participants are hidden from the researcher as well.
- 42.** The Family Educational Rights and Privacy Act of 1974, referred to as the Buckley Amendment, protects the privacy of the educational records of students. It stipulates that data that identify participants by name may not be made available to the researcher unless written permission is granted by the participants.

Deception

- 43.** Studies involving deception of participants are sometimes unavoidable but should be examined critically for unethical practices.

Ethical Issues Unique to Qualitative Research

- 44.** Qualitative researchers, because of their closeness to participants, must pay special attention to ethical issues and view informed consent as a process that evolves and changes throughout the study. Qualitative researchers may witness dangerous or illegal behavior and may have to make ethical decisions on the spot.

Gaining Entry to the Research Site

- 45.** It is rarely possible to conduct research without the cooperation of other people. The first step in acquiring needed cooperation is to follow required procedures in the chosen site.

46. A formal approval process usually involves the completion of one or more forms describing the nature of the research and the specific request being made of the school or other system.
47. The key to gaining approval and cooperation is good planning and a well-designed, carefully constructed study.
48. After formal approval for the study is granted, you should invest the time necessary to explain the study to the principal, the teachers, and perhaps even parents. If these groups do not cooperate, you will likely not be able to do your study.
49. If changes in the study are requested and can be made to accommodate the normal routine of the participants, these changes should be made unless the research will suffer as a consequence.
50. The feelings of participants should be monitored and responded to throughout the study if the initial level of cooperation is to be maintained. Human relations are important when conducting research in applied research settings.



UNDERSTANDING RESEARCH

EXERCISE 1.1: Recognizing the characteristics of quantitative and qualitative research

Read the articles by Hamre and Pianta (2005) and Sleeter (2009) that appear in Chapter 1 of the textbook then answer questions by clicking on the link below.

ENHANCEDetext *Understanding Research Articles*



READING RESEARCH

EXERCISE 1.2: Identifying steps in the research process

Read the articles by Hamre and Pianta (2005) and Sleeter (2009) that appear in Chapter 1 of the textbook then answer questions by clicking on the link below.

ENHANCEDetext *Reading Research Articles*



THINKING LIKE A RESEARCHER

EXERCISE 1.3: Understanding research ethics

Read the articles by Hamre and Pianta (2005) and Sleeter (2009) that appear in Chapter 1 of the textbook then answer questions by clicking on the link below.

ENHANCEDetext *Thinking Like a Researcher*

PERFORMANCE CRITERIA

TASK 1

Tasks 1A and 1B

Reprints of two published research reports appear on the following pages (Task 1A Quantitative Example and Task 1B Qualitative Example). Read the reports and then state the following for each study:

- Research design
- Rationale for the choice of the design
- Major characteristics of the design including: research problems, methods of data analysis, and major conclusions
- Ethical issues confronted by the researcher and how they were addressed

One sentence should be sufficient to describe the research design and the rationale for the choice of the design. Six sentences or less will adequately describe the major procedures of most studies. For the major characteristics of the design, one or two sentences will usually be sufficient to state the research problems and the method of data analysis. You are expected only to identify the analysis, not explain it. The major conclusion that you identify and state (one or two sentences should be sufficient) should directly relate to the original topic. Statements such as “more research is needed in this area” do not represent major conclusions. One or two sentences will usually be sufficient to describe any ethical issues confronted by the researcher and how they were addressed.

Suggested responses to these tasks appear in Appendix B of this text. If your responses differ greatly from those suggested, study the reports again.

Task 1C

Brief descriptions of five research studies follow these instructions. Read each description and decide whether the study represents a survey, correlational, causal-comparative, experimental, single-subject, narrative, ethnographic, or case study approach. State the research approach for each topic statement, and indicate why you selected that approach. Your reasons should be related to characteristics that are unique to the type of research you have selected.

1. In this study, researchers administered a questionnaire to determine how social studies teachers felt about teaching world history to fifth-graders.
2. This study was conducted to determine whether the Acme Interest Test provided similar results to the Acme Interest Test.
3. This study compared the achievement in reading of fifth-graders from single-parent families and those from two-parent families.
4. This study divided fifth-grade students in a school into two groups at random and compared the results of two methods of conflict resolution on students' aggressive behavior.
5. This study examined the culture of recent Armenian emigrants in their new setting.

Suggested responses appear in Appendix B.

TASK 1A Quantitative Example

Can Instructional and Emotional Support in the First-Grade Classroom Make a Difference for Children at Risk of School Failure?

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ABSTRACT This study examined ways in which children's risk of school failure may be moderated by support from teachers. Participants were 910 children in a national prospective study. Children were identified as at risk at ages 5–6 years on the basis of demographic characteristics and the display of multiple functional (behavioral, attention, academic, social) problems reported by their kindergarten teachers. By the end of first grade, at-risk students placed in first-grade classrooms offering strong instructional and emotional support had achievement scores and student–teacher relationships commensurate with their low-risk peers; at-risk students placed in less supportive classrooms had lower achievement and more conflict with teachers. These findings have implications for understanding the role that classroom experience may play in pathways to positive adaptation.

Application of the scientific method: selection and definition of a problem—whether experiences in high-quality classrooms can help close the gap between children at risk of school failure and their low-risk peers in the early grades.

- (01) Identifying the conditions under which experiences in school settings can alter the early trajectories of children's social or academic functioning has important implications for understanding pathways to children's positive adaptation. Of particular interest is whether experiences in high-quality classrooms can help close the gap between children at risk of school failure and their low-risk peers, particularly in the early grades when small increments in achievement play a large role in eventual outcomes (Alexander, Entwisle, & Kabbani, 2001; Ferguson, 1998; Phillips, Crouse, & Ralph, 1998; Ross, Smith, Slavin, & Madden, 1997). Two bodies of work are relevant to this question. The first examines everyday classroom interactions between teachers and children that predict more positive development for all children (Brophy & Good, 1986; Gage & Needel, 1989; Howes et al., 2005; NICHD ECCRN, 2003; Pianta, LaParo, Payne, Cox, & Bradley, 2002; Rimm-Kaufman, LaParo, Pianta, & Downer, in press; Ritchie & Howes, 2003; Skinner & Belmont, 1993; Stipek et al., 1998). The second area of research provides evidence of specific school-based interventions that may alter trajectories for students with

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various risk factors (Battistich, Schaps, Watson, & Solomon, 1996; Durlak & Wells, 1997; Elias, Gara, Schuyler, Branden-Muller, & Sayette, 1991; Greenberg et al., 2003; Weissberg & Greenberg, 1998; Wilson, Gottfredson, & Najaka, 2001). At the intersection of these areas of education and developmental science is the question of whether students' everyday instructional and social interactions with teachers in the classroom may themselves ameliorate the risk of school failure. If this were the case, focused efforts related to teacher training and support, curriculum implementation, and assessments of classroom settings could be used more strategically to counter the tendency toward poor outcomes for such children (see Pianta, in press, for a discussion). The current study used data from a large, national prospective study of children and families to examine ways in which risk of school failure may be moderated by strong support from teachers in the first-grade classroom. Specifically, we examined whether children at risk of early school failure experiencing high levels of instructional and emotional support in the first grade displayed higher achievement and lower levels of student-teacher conflict than did their at-risk peers who did not receive this support.

Everyday Classroom Interactions and Student Outcomes

Research on everyday classroom processes that may alter trajectories for students at risk has its foundations in the process-product research from the 1960s to 1980s that focused attention on observable teacher behaviors (Brophy & Good, 1986; Gage & Needel, 1989) and in developmentally informed theories of schooling that focus attention on socio-emotional, motivational (Connell & Wellborn, 1991; Deci & Ryan, 1985; Eccles, 1993; Wentzel, 2002) and instructional (e.g., Resnick, 1994; Stevenson & Lee, 1990) experiences in classrooms that trigger growth and change in competence. Although it posited the type of interactions between student characteristics and teacher behaviors that are now beginning to be reported in the literature (e.g., Morrison & Connor, 2002; Rimm-Kaufman et al., 2002) and has resulted in frameworks for describing classroom processes that inform educational research (e.g., Brophy, 2004), the process-product research tradition did not yield a body of empirical findings that provide a strong case for classroom effects, particularly in relation to issues such as moderation of child characteristics. Reviews of the contribution of this literature in large part note the lack of grounding in developmental and psychological research as well as the complex and interactive nature of student's classroom experiences (Gage & Needel, 1989; Good & Weinstein, 1986). Within developmental psychology, the focus on proximal processes in ecological models (Bronfenbrenner & Morris, 1998; Lerner, 1998; Sameroff, 1995, 2000) and the extension of these perspectives to school settings (Connell & Wellborn, 1991; Pianta, 1999; Resnick, 1994; Stevenson & Lee, 1990) have advanced efforts to understand the interactive processes through which children and adolescents experience, the classroom environment (Pianta, in press). Roeser, Eccles, and Sameroff (2000) extend the linkage between developmental studies and education, even further when arguing, with respect to understanding middle school effects, for research "linking the study of adolescents' experience, motivation, and behavior in school with the study of their teachers' experience, motivation, and behavior at school" (p. 466). This explicit need to focus on the interaction of child characteristics with types or categories of resources available in classroom (and school) settings is consistent with Rutter and Maughan's (2002) analysis of shortcomings in the school-effects literature. However, if such an approach is to yield more fruitful results than the process-product work, it is in large part predicated on more sophisticated understandings of the developmental needs of children vis-à-vis experiences in school (e.g., Reid, Patterson, & Snyder, 2002) and parallel efforts to understand and measure developmentally relevant assets in school environments (see Morrison & Connor, 2002; Rimm-Kaufman et al., 2002, as recent examples).

- (03) One avenue for advancing the understanding of schooling as a moderator of child (or background) characteristics is the assessment of variation in the nature, quality, and quantity of teachers' interactions with students (e.g., Burchinal et al., 2005). Recent large-scale observational studies indicate that these types of interaction within classrooms are highly variable (e.g., National Institute of Child Health and Human Development, Early Child Care Research Network (NICHD ECCRN), 2002b, in press). Even the most well-described, manualized, standardized, scientifically based classroom intervention programs are enacted in practice in ways that vary widely from child to child or classroom to classroom (e.g., Greenberg, Doitrovich, & Bumbarger, 2001). In descriptions of less-tightly prescribed classroom interactions, the degree to which classroom teachers make productive use of time or classrooms are well-managed ranges across the full spectrum of possibilities, even though kindergartens and first-grade classes appear, on average, to be positive and supportive social settings (NICHD ECCRN, 2002b, in press; Pianta et al., 2002).
- (04) In recent large-scale observational studies of pre-k to elementary classrooms, two dimensions consistently emerge: instructional support and emotional support (NICHD ECCRN, 2002b, in press; Pianta et al., 2002; Pianta, LaParo, & Hamre, 2005). Interestingly, these two dimensions, to some extent, predict differentially children's social and academic outcomes, confirming theoretical views that various developmental needs of children may interact differentially with the qualities of school settings (Connell & Wellborn, 1991; Morrison & Connor, 2002; Rutter & Maughan, 2002). For example, when evaluated in the same prediction model, instructional support for learning predicts achievement outcomes to a significantly greater degree than emotional support predicts these same outcomes (Howes et al., 2005). On the other hand, children's anxious behavior reported by mothers (but not academic performance) is predicted by the degree of classroom structure and instructional press in the first grade (NICHD ECCRN, 2003), while higher levels of emotional support predict a very broad range of social and task-oriented competencies such as following directions (Howes et al., 2005). Morrison and Connor (2002) argue that the effects of schooling on development have to be modeled at the level of specific forms of input and resource that are matched to specific child needs, abilities, and skills. Thus, according to Morrison and Connor (2002), it is not only necessary to conceptualize and measure the classroom setting (or school) in terms of specific aspects of instructional or social environment, but also to gauge the effects of those experiences relative to how well they match the child's capacities and skill. In this view, school effects are predominantly in the form of interactions between specific inputs from the classroom and the characteristics of the child.
- (05) These two broad dimensions of everyday teacher–student classroom interactions—emotional and instructional support—with theoretical and empirical links to student development, can be a starting point for examining interactions with child and background characteristics, particularly attributes that place children at risk for school failure. In global observations reported in the literature, emotional support encompasses the classroom warmth, negativity, child-centeredness as well as teachers' sensitivity and responsiveness toward specific children (NICHD ECCRN, 2002b, in press). This should not be surprising as a number of developmentally informed theories suggests that positive and responsive interactions with adults (parents, teachers, child-care providers) contribute to regulation of emotional experience and social behavior, the development of skills in social interactions, and emotional understanding (Birch & Ladd, 1998; Connell & Wellborn, 1991; Eccles, 1993; Howes, 2000; Howes, Matheson, & Hamilton, 1994; Pianta, 1999; Wentzel, 2002). Confirming this perspective are results indicating that exposure to positive classroom climates and sensitive teachers is linked to greater self-regulation among elementary and middle school students (Skinner,

Zimmer-Gembeck, & Connell, 1998), greater teacher-rated social competence (Burchinal et al., 2005; Howes, 2000; Pianta et al., 2002), and decreases in mother-reported internalizing problems from 54 months to the end of the first grade (NICHD ECCRN, 2003).

From a somewhat different theoretical perspective, teachers' emotional support directly provides students with experiences that foster motivational and learning-related processes important to academic functioning (Crosnoe, Johnson, & Elder, 2004; Greenberg et al., 2003; Gregory & Weinstein, 2004; Pianta et al., 2002; Rimm-Kaufman et al., in press; Roeser et al., 2000; Zins, Bloodworth, Weissberg, & Walberg, 2004). Theories of motivation suggest that students who experience sensitive, responsive, and positive interactions with teachers perceive them as more supportive and are more motivated within the academic contexts of schooling (Connell & Wellborn, 1991; Deci & Ryan, 1985; Eccles, 1993). In the early grades, Pianta et al. (2002) found that when teachers offered a more child-centered climate, kindergarten children were observed to be more often on-task and engaged in learning. Among older students, perceptions of positive relatedness to teachers predict gains in student engagement over the course of the school year (Furrer & Skinner, 2003), increased motivation to learn (Roeser et al., 2000), and greater academic achievement (Crosnoe et al., 2004; Gregory & Weinstein, 2004). Consistent with this link between motivation and support from adults, teacher support was related to sixth graders' school and class-related interests and pursuit of social goals (Wentzel, 2002), which in turn predicted pursuit of social goals and grades in the seventh grade. For children at risk of problems in school, Noam and Herman's (2002) school-based prevention approach emphasizes the primary importance of relationships with a school-based mentor (Noam, Warner, & Van Dyken, 2001), based explicitly on the rationale that such relationships function as resources and resilience mechanisms in counteracting the effects of risk mechanisms attributable to problems in family relationships.

Notwithstanding the importance of relationships and social support, the nature and quality of instruction is of paramount importance for the value of classroom experience that is intended to produce gains in learning; in elementary school, instruction is under great scrutiny as a result of standards and performance evaluations (Pianta, in press). Although the apparent dichotomy between child-centered and direct instruction has for some years dominated discussions of learning in the early grades (see Stipek et al., 1998), there is accumulating evidence that teachers' instructional interactions with children have the greatest value for students' performance when they are focused, direct, intentional, and characterized by feedback loops involving student performance (Dolezal, Welsh, Pressley, & Vincent, 2003; Juel, 1996; Meyer, Wardrop, Hastings, & Linn, 1993; Pianta et al., 2002; Torgesen, 2002). Torgesen (2002) provides an explicit example of this type of instruction applied to the area of reading by suggesting three primary ways in which everyday teaching can contribute to growth in reading skills: the provision of explicit teaching experiences and practice (i.e., phonemic skills, vocabulary); more productive classroom time in which there are more opportunities for teaching and learning; and intensive scaffolding and feedback to students about their progress. The value of intentional, focused interaction and feedback is not limited to reading, but appears to be a key component in other skill domains such as writing (Matsumura, Patthey-Chavez, Valdes, & Garnier, 2002) that may extend to cognition and higher order thinking (Dolezal et al., 2003).

In addition, these instructional inputs are also associated with more positive and fewer negative interactions between students and teachers, and higher levels of attention and task-oriented behavior (NICHD ECCRN, 2002a; Pianta et al., 2002). Yet, as was the case for emotional support in classrooms, large-scale studies document great variation in the frequency and quality of

these instructional procedures within early elementary school classrooms (Meyer et al., 1993; NICHD ECCRN, 2002a, in press). For example, within the NICHD Study of Early Child Care sample (NICHD ECCRN, 2002b, in press), teachers provided specific academic instruction in an average of 8% of all observed intervals over the course of a morning-long observation. However, the range was remarkable, with some classrooms providing no explicit instruction and others providing this instruction in almost 70% of observed intervals. This variability provides an opportunity to examine ways in which exposure to these classroom processes may impact student achievement.

- (09) Taken together, research on the nature and quality of early schooling experiences provides emerging evidence that classroom environments and teacher behaviors are associated in a “value-added” sense with student outcomes. Yet, until recently, few researchers have specifically examined the possibility that these everyday processes in elementary school classrooms may help close (or increase) the gap in student achievement observed among students at risk of school failure because of demographic characteristics (low income, minority status) or functional risks such as serious behavioral and emotional problems. Although there is increasing evidence from well-designed and highly controlled studies that school-based interventions that prescribe certain desired teacher–child interactions can succeed in ameliorating some risks (Catalano et al., 2003; Greenberg et al., 2001; Ialongo et al., 1999; Walker, Stiller, Severson, Feil, & Golly, 1998), there is little available evidence on whether features of classrooms and child–teacher interactions such as emotional or instruction support, present in everyday classroom interactions in naturally varying samples, are sufficiently potent to counteract risk for school failure.

Everyday Interactions and Risk for Early School Failure

- (10) Recent evidence from developmentally informed studies of naturally occurring variation in classroom environments directly tests the hypothesis that everyday experiences within elementary classrooms may moderate outcomes for children at risk (Peisner-Feinberg et al., 2001). In one such study, Morrison and Connor (2002) demonstrate that children at risk of reading difficulties at the beginning of the first grade (identified on the basis of test scores) benefited from high levels of teacher-directed explicit language instruction—the more teacher-directed, explicit instruction they received, the higher were their word-decoding skills at the end of the first grade. In contrast, teacher-directed explicit instruction made no difference in decoding skills for children with already high skills on this dimension upon school entry. These highly skilled children made the strongest gains in classrooms, with more child-led literacy-related activities.
- (11) In another study providing evidence of the moderating effect of teachers’ classroom behaviors on outcomes for at-risk children, Rimm-Kaufman et al. (2002) examined whether teacher sensitivity predicted kindergarten children’s behavior for groups of socially bold and wary children, with the bold children demonstrating high levels of off-task behavior and negative interactions with peers and teachers. Although there was no relation between teachers’ sensitivity and child classroom behavior among the socially wary children, socially bold children who had more sensitive teachers were more self-reliant and displayed fewer negative and off-task behaviors than did bold children with less sensitive teachers. Similarly, two recent studies suggest that student–teacher conflict is a stronger predictor of later problems for children who display significant acting out behaviors than for their peers who do not display these behavior problems (Hamre & Pianta, 2001; Ladd & Burgess, 2001). Taken together, these studies suggest that positive social and instructional experiences within the school setting may help reduce children’s risk, while negative interactions between teachers and children may be particularly problematic for those children displaying the highest

risk of school failure. In the present study, we follow and extend the work of Morrison and Connor (2002) and Rimm-Kaufman et al. (2002) to examine effects of two dimensions of classroom process (instructional and emotional quality) on moderating the association(s) between two forms of risk for failure in achievement and social adjustment in the first grade.

Defining School-Based Risk

Although conceptualizations of risk vary, two central categories of children's risk for early school failure relate to *demographic* and *functional* risks. Prior to entering school, it is largely family and demographic factors that place children at risk of failure. One of the most robust of these demographic risk indicators is low maternal education (e.g., Christian, Morrison, & Bryant, 1998; Ferguson, Jimerson, & Dalton, 2001; NICHD ECCRN, 2002a; Peisner-Feinberg et al., 2001; Shonkoff & Phillips, 2000). One reason posited for this is that children of mothers with low levels of education are less likely to be exposed to frequent and rich language and literacy stimulation (Bowman, Donovan, & Burns, 2001; Christian et al., 1998; Hart & Risley, 1995; U.S. Department of Education, 2000) and thus may come to kindergarten with fewer academic skills (Pianta & McCoy, 1997). These early gaps are often maintained throughout children's school careers (Alexander et al., 2001; Entwisle & Hayduk, 1988; Ferguson et al., 2001).

In addition to demographic factors that signal risk, indicators reflecting children's general functioning and adaptation in the classroom as they enter school (behavioral, attention, social, and academic problems) are established predictors of success or failure in the next grade(s). Children identified by their teachers as displaying difficulties in these domains in the early school years are at higher risk of problems throughout their school careers (Alexander et al., 2001; Flanagan et al., 2003; Hamre & Pianta, 2001; Ladd, Buhs, & Troop, 2002; Lewis, Sugai, & Colvin, 1998). Although problems in individual domains of functioning predict future difficulties, research suggests that the accumulation of multiple risks is typically a much stronger indicator of later problems (Gutman, Sameroff, & Cole, 2003; Seifer, Sameroff, Baldwin, & Baldwin, 1992) and therefore our approach to conceptualizing and assessing functional risk will rely on multiple indicators.

Current Study

The current study was designed to extend work related to school effects by following children identified in kindergarten as being at risk of school failure and examining whether the classroom environment to which they were exposed during the first grade moderated these risks by the end of the first grade. Rutter and Maughan (2002) suggest that effectively testing environmental influences on child development requires attending to several methodological issues. First, they suggest using longitudinal data to measure change within individuals. We were interested in assessing achievement and relational functioning in first grade as a function of the support these children received from teachers; therefore, we needed to adjust for previous performance on these outcomes. Ideally, we would adjust for performance at the beginning of the first-grade year; however, because multiple assessments were not available within the first-grade year, we adjusted for earlier performance on the outcomes (completed at either 54 months or kindergarten). Secondly, Rutter and Maughan (2002) suggest using some form of a *natural experiment* that "pulls apart variables that ordinarily go together" (p. 46). Within this study, the classroom process itself served as the natural experiment, in which children with differing risk backgrounds in kindergarten were placed in first-grade classrooms offering varying levels of emotional and instructional support. Their third recommendation suggests quantified measurement of the postulated causal factor; here we use observations of teachers' instructional

(12)

(13)

(14)

Selection of a problem—identification of children in kindergarten as being at risk of school failure and examining whether the classroom environment to which they were exposed during first grade moderated these risks by the end of first grade.

Classification of research by approach—"a natural experiment"—or causal-comparative research.

Causal-comparative research "grouping variable" is the classroom process offering varying levels of emotional and instructional support.

and emotional support conducted within classrooms, a notable difference from most previous research on classroom effects, which relies on structural features of the classroom or teacher-reported practices. Two of Rutter and Maughan's (2002) last three recommendations, testing for a dose response gradient and controlling for social selection, initial level, and self-perpetuating effects, were also attended to within this study. The last recommendation, explicitly testing the hypothesized mechanism against some competing explanations, was beyond the scope of this study, although the implications of not testing competing explanations are addressed in the discussion.

- (15) Because of an interest in examining both academic and social functioning, we examined two major outcomes—performance on an individually administered, standardized achievement battery, and first-grade teacher ratings of conflict with the student. Although student–teacher conflict could be viewed as a classroom process, when assessed via the teachers' perspective, it is best conceptualized as an outcome derived in part from the teachers' social or instructional interactions toward the child. Teachers' rating of their relationship with children measure the extent to which students are able to successfully use the teacher as a resource in the classroom. Thus, although teachers' interactions with students are expected to influence relationships in important ways, these relationships are themselves key indicators of school adaptation. This conceptualization of relationships as outcomes was validated by a study showing that kindergarten teachers' perceptions of conflict with students were stronger predictors of behavioral functioning through the eighth grade than were these same teachers' ratings of behavior problems (Hamre & Pianta, 2001).

Dependent variables are "performance on an individually administered standardized achievement battery" and "first-grade teacher ratings of conflict with the student."

- (16) Globally, we expected that children in the risk groups would be more likely than children at low risk to benefit from placement in classrooms offering high levels of support and that placement in high-quality classrooms would help at-risk students catch up to their low-risk peers. More specific hypotheses require a consideration of the mechanisms through which we expect the risk factors to operate. For example, children whose mothers have low levels of education tend to have less exposure to pre-academic experiences within the home (Bowman et al., 2001; U.S. Department of Education, 2000); thus, we expected that these children would benefit academically from high levels of instructional support within the classroom. In contrast, children displaying behavioral and social problems in kindergarten may require higher levels of emotional support to adjust to the demands of the first grade. However, by responding to children's social and emotional needs, teachers may not only help children adapt socially, but may allow these children to more successfully access the instructional aspects of classrooms; thus, we expected that high levels of emotional support would be associated with more positive academic experiences and lower levels of teacher–child conflict for children displaying multiple functional risks in kindergarten.

Method

Participants

- (17) Children included in this study took part in the NICHD Study of Early Child Care. The children's mothers were recruited from hospitals located in or near Little Rock, AK; Irvine, CA; Lawrence, KS; Boston, MA; Philadelphia, PA; Pittsburgh, PA; Charlottesville, VA; Morganton, NC; Seattle, WA; and Madison, WI. In 1991, research staff visited 8,986 mothers giving birth in these hospitals. Of these mothers, 5,416 met eligibility criteria and agreed to be contacted after returning home from the hospital. A randomly selected subgroup (with procedures to ensure economic, educational, and ethnic diversity) were contacted and enrolled in the study. This resulted in a sample of 1,364 families with healthy newborns. Details of this selection procedure are published in the study manuals (NICHD ECCRN, 1993).

Scientific method, Selection of a sample.

Classroom observations were conducted in the children's second year of school, which for the majority was the first grade. Of the original sample of 1,364 children, 910 had complete data and were included in the current study. Analyses comparing the children included in this investigation with the entire sample indicate selected attrition: among all children who began the study, White children and those with mothers with higher education were more likely to have data collected in the first grade, $\chi^2(3, N = 1,364) = 18.14, p < .001$ and $\chi^2(3, N = 1,364) = 16.75, p < .001$, respectively. Among the children in the present study, 49% were female. The majority were White ($n = 723$), followed in frequency by African American ($n = 96$), Hispanic ($n = 50$), and Other ($n = 39$). Maternal education ranged from 7 to 21 years, with a mean of 14.45 years. The income-to-needs ratio, used to measure income relative to the number of household members, was average across the period of study (54 months, kindergarten, and first grade) and ranged from .15 to 33.77, with an average of 3.73. These factors indicate a largely nonpoverty sample, although there was considerable range. (18)

Overview of Data Collection

Children in this study were followed from birth through the first grade. Maternal education and child ethnicity were reported when children were one-month old. Child outcomes and measures of classroom process were collected in the spring of the children's first-grade year. The 827 classrooms were distributed across 747 schools, in 295 public school districts, in 32 states. Earlier assessments, conducted when the children were 54 months and in kindergarten, provided measures of children's risk status as well as a measure of children's prior functioning on the outcomes of interest. Further documentation about all data collection procedures, psychometric properties of measures, and descriptions of how composites were derived are documented in the Manuals of Operations of the NICHD Study of Early Child Care (NICHD ECCRN, 1993). (19)

Risk Indicators

Children in this study were grouped based on their status on *functional* and *demographic* indicators of risk. Functional indicators of risk included measures of children's attention, externalizing behavior, social skills, and academic competence. The last three measures were collected through teacher report when the study children were in kindergarten. Unfortunately, individual child assessments were not conducted when children were in kindergarten. Because of an interest in including a non-teacher-reported risk variable and based on data showing the links between sustained attention and school failure (Gordon, Mettelman, & Irwin, 1994), the attention risk variable used in this investigation was collected during child assessments conducted when children were 54 months old. Students whose mothers had less than a 4-year college degree were placed in the demographic risk group. Information on the measures and procedures used to identify children at risk of school failure is provided below. (20)

Functional Risk

Sustained attention. Sustained attention was assessed using a continuous performance task (CPT) based on the young children's version described by Mirsky, Anthony, Duncan, Aheani, and Kellam (1991). This measure consisted of a computer-generated task in which children are asked to push a button each time a target stimulus appears. The number of omission errors was used as the unit of analysis for this study. The CPT has adequate test-retest reliability ($r = .65 - .74$) and has high content and predictive validity (Halperin, Sharman, Greenblat, & Schwartz, 1991). (21)

- (22) *Externalizing behaviors.* Externalizing behaviors were assessed with the teacher report form (TRF; Achenbach, 1991), a widely used measure of problem behaviors that has been standardized on large samples of children. This measure lists 100 problem behaviors and has teachers rate them as not true (0), somewhat true (1), or very true (2) of the student. The externalizing problems standard score was used for these analyses. This scale contains teachers' reports on children's aggressive (e.g., gets in many fights; cruelty, bullying, or meanness to others; physically attacks people), attention (e.g., cannot concentrate; fails to finish things he/she starts), and defiant behaviors (e.g., defiant, talks back to staff; disrupts class discipline). The reliability and validity of the TRF has been widely established (see Bérubé & Achenbach, 2001, for a review).
- (23) *Social skills and academic competence.* Students' social skills and academic competence were assessed with the social skills rating system–teacher form (SSRS; Gresham & Elliot, 1990). This measure consists of three scales: social skills, problems behaviors, and academic competence. Because the TRF is a more established measure of problem behaviors, only the social skills and academic competence scales were used in these analyses. The social skills composite asks teachers to rate the frequency of classroom behaviors (0 = never, 1 = sometimes, two = very often) in three areas related to positive social adjustment in school settings: cooperation (e.g., paying attention to instructions, putting away materials properly), assertion (e.g., starting conversations with peers, helping peers with classroom tasks), and self-control (e.g., responding to peer pressure appropriately, controlling temper). Within this sample, the coefficient α for the social skills composite was .93. The academic competence composite asks teachers to judge children's academic or learning behaviors in the classroom on a 5-point scale that corresponds to the percentage clusters of the students in the class (1 = lowest 10%, 5 = highest 10%). Within this sample, the coefficient α for this scale was .95. Scores are standardized based on norms from a large, national sample of children. The SSRS has sufficient reliability and has been found to correlate with many other measures of adjustment (Gresham & Elliot, 1990).
- (24) *Functional risk status.* Students' risk status was determined for each of these four indicators. Children with standardized scores at least one standard deviation below the mean (85 or lower) on the social skills and academic competence scales were placed in the social risk ($n = 83$; 10%) and academic risk groups ($n = 112$; 13%), respectively. Similarly, children who fell one standard deviation above the mean on the number of omission errors on the CPT were included in the attention risk group ($n = 144$; 17%). Consistent with recommendations in the TRF manual (Achenbach, 1991), children in the externalizing problems risk group had T scores at or above 62 on the externalizing problems factor ($n = 80$; 9%). Given previous research indicating that multiple, rather than isolated, risks are most predictive of later problems (Gutman et al., 2003; Seifer et al., 1992), each child was given a risk score created by summing the number of risks. The children were then split into two groups, those with zero or one risk ($n = 811$; 89%), referred to within the remainder of this report as displaying "low functional risk," and those with multiple risks ($n = 99$; 11%), referred to as displaying "high functional risk." Among children in the low functional risk group, 73% had no risk factors and 25% had one risk factor. Among children in the high functional risk group, 73% had two risk factors, 21% had three risk factors, and 6% had all four risk factors. Among this high functional risk group, academic problems were most common (72%), followed by social skills problems (63%), attention problems (59%), and externalizing problems (36%).

Demographic Risk

- (25) We were also interested in following the trajectory of children who have typically been identified as at risk of school failure—children whose mothers have low levels of education. Among this sample, 249 children (27%) had

mothers with less than a 4-year college degree. This cutpoint was chosen to provide an adequate sample size and is validated as a risk indicator in later analyses; implications of the moderate level of risks in this sample are included in the discussion. Ways in which school processes may moderate this risk factor were hypothesized to differ from the functional risk factor; thus, rather than composting demographic risk with those manifest in child behavior or skills, demographic risk was maintained as a separate indicator. Although low maternal education children were more likely than other children to display functional risks, the majority (78%) of those with low maternal education were in the low functional risk group.

Child Outcomes

Achievement. Children’s achievement was assessed with the Woodcock–Johnson Psycho-educational Battery-Revised (WJ-R; Woodcock & Johnson, 1989), a standardized measure of young children’s academic achievement with excellent psychometric properties (Woodcock & Johnson, 1989). At each assessment point, several subtests were given out of the cognitive and achievement batteries. The cognitive battery included an assessment of long-term retrieval (Memory for Names), short-term memory (Memory for Sentences), auditory processing (Incomplete Words), and comprehensive knowledge (Picture Vocabulary). The achievement battery included measures of reading (Letter–Word Identification and Word Attack) and mathematics (Applied Problems). Memory for Names and Word Attack were only administered in first grade; all other tests were given at both 54 months and first grade. Because of the high levels of association between measures of cognitive ability and achievement, all subtests were composited at each time point, and are referred to for the remainder of this report as achievement scores. The coefficient α at 54 months was .80, and at first grade it was .83. Descriptives on the achievement battery are provided in Table 1.

(26)

Scientific method, Execution of research procedures. Data collection strategies are used to measure three dependent variables: 1) children’s achievement, 2) student-teacher relationships, and 3) classroom processes.

Student–Teacher Relationships. Children’s relational functioning was assessed with the Student–Teacher Relationship Scale (Pianta, 2001), a 28-item rating scale, using a Likert-type format, designed to assess teachers’ perceptions of their relationship with a particular student. This scale has been used extensively in studies of preschool-age and elementary-age children (e.g., Birch & Ladd, 1997, 1998; Hamre & Pianta, 2001; Howes & Hamilton, 1992). The conflict scale assesses the degree of negative interactions and emotions involving the teacher and child and contains items such as, “This child easily becomes angry at me” and “This child and I always seem to be struggling with each other.” Coefficient α for conflict was .93 among this sample. Descriptives on the conflict scores are provided in Table 1.

(27)

Table 1

Mean (Standard Deviation) on Academic Achievement (Woodcock–Johnson) and Student–Teacher Conflict by Time and Risk Status

	Kindergarten functional risk		Demographic risk (maternal education)	
	Low (<i>n</i> = 881)	High (<i>n</i> = 99)	Low (<i>n</i> = 661)	High (<i>n</i> = 249)
Woodcock–Johnson composite				
54 months	100.40 (10.79)	87.81 (10.42)	101.56 (10.50)	92.33 (11.24)
First	106.45 (9.78)	94.93 (10.42)	107.39 (9.58)	99.37 (10.54)
Student–teacher conflict				
K	9.80 (4.47)	15.74 (7.15)	10.00 (4.76)	11.74 (6.05)
First	10.28 (4.63)	14.59 (6.19)	10.32 (4.67)	11.91 (5.64)

- (28) **Classroom Process.** Classroom process was measured using the Classroom Observation System for First Grade (COS-1; NICHD ECCRN, 2002b). Trained data collectors observed each classroom on 1 day during the spring of the first-grade year. Classrooms were observed for approximately 3 hr during a morning-long period beginning with the official start of the school day on a day the teacher identified as being focused on academic activities. Observers made global ratings of classroom quality and teacher behavior using a set of 7-point rating scales. Some of the scales focused on global classroom quality and others focused specifically on the teacher's interaction with the study child. Global ratings of classroom-level dimensions included overcontrol, positive emotional climate, negative emotional climate, effective classroom management, literacy instruction, evaluative feedback, instructional conversation, and encouragement of child responsibility. Rating scales for the teacher's behavior toward the target child included sensitivity/responsivity, intrusiveness/overcontrol, and detachment/disengagement. A summary of these ratings is provided in Table 2. A rating of 1 was assigned when that code was "uncharacteristic," a 3 was assigned when the description was "minimally

Table 2

Summary of COS-1 Rating of Emotional and Instructional Climate

Composite Construct	Description (at high end)
Emotional support	
Teacher Sensitivity	The sensitive teacher is tuned in to the child and manifests awareness of the child's needs, moods, interests, and capabilities, and allows this awareness to guide his/her behavior with the child
Intrusiveness (reversed)	An intrusive teacher imposes his/her own agenda on the child and interactions are adult-driven, rather than child-centered
Detachment (reversed)	A detached teacher shows a lack of emotional involvement and rarely joins in the child's activities or conversations
Positive climate	A positive classroom is characterized by pleasant conversations, spontaneous laughter, and exclamations of excitement. Teachers demonstrate positive regard and warmth in interactions with students
Classroom management	In a well-managed classroom, the teacher has clear yet flexible expectations related to the classroom rules and routines. Children understand and follow rules and the teacher does not have to employ many control techniques
Negative climate (reversed)	A negative classroom is characterized by hostile, angry, punitive, and controlling interactions in which the teacher displays negative regard, disapproval, criticism, and annoyance with children
Over-control (reversed)	The over-controlled classroom is rigidly structured and children are not given options for activities but instead must participate in very regimented ways
Instructional support	
Literacy instruction	This rating captures the amount of literacy instruction in the classroom. At the high end, the teacher frequently reads and teaches phonics and comprehension
Evaluative feedback	This rating focuses on the quality of verbal evaluation of children's work comments or ideas. At the high end feedback focuses on learning, mastery, developing understanding, personal improvement, effort, persistence, or trying new strategies
Instructional conversation	This scale focuses on the quality of cognitive skills or concepts elicited during the teacher-led discussions. At the high end children are encouraged to engage in conversations and expand on their ideas and perceptions of events. Teachers ask open-ended questions such as "what do you think?"
Encouragement of child responsibility	Children in classrooms high on this scale are encouraged to take on jobs, asked to offer solutions to classroom problems, and take responsibility for putting away materials, etc.

characteristic,” a 5 was assigned when the description of the code was “very characteristic” of the classroom, and a 7 was assigned under circumstances in which the code was “extremely characteristic” of the observed classroom or teacher–child interactional pattern.

Observers from all 10 sites trained on practice videotapes using a standardized manual that provided extensive descriptions of codes and anchor points. They trained on these videotaped observations prior to attending a centralized training workshop. After the training workshop, coders returned to their sites, conducted pilot observations, and trained on one to two more videotaped cases. All observers had to pass a videotaped reliability test involving six cases. Criteria for passing were an 80% match (with 1 scale point) on the global rating scales. All coders passed at these levels on a reliability test before being certified to conduct observations in the field. (29)

These scales were factor analyzed and averaged into two composite indicators of the classroom environment: emotional support and instructional support. The emotional support composite included ratings of overcontrol (reflected), positive emotional climate, negative emotional climate (reflected), effective classroom management, teacher sensitivity, intrusiveness (reflected), and detachment (reflected). The instructional support composite included ratings of literacy instruction, evaluative feedback, instructional conversation, and encouragement of child responsibility. These two composites are moderately associated with one another ($r = .57$). Table 2 provides a summary of these scales. For details on these composites and the training of observers, refer to NICHD ECCRN (2002b). Of note is the fact that, although only one observation was made for the majority of classrooms (one visit per child enrolled in the study), for almost 60 classrooms there was more than one child enrolled and hence more than one observation was conducted. For these classrooms, the correlations between pairs of the global ratings described above was, on average, higher than .70, indicating that these ratings reflect quite stable features of the classroom environment (NICHD ECCRN, 2004). (30)

The COS-1 composites were used to categorize classrooms into offering high, moderate, and low support (using 33% cutpoints). We used these cutoffs, rather than continuous measures of classroom process, because of our interest in creating a natural experiment and decided on cutting the sample in thirds to capture adequate range while allowing for ease of interpretation and analysis. For emotional support, the 303 classrooms in the Low category ranged from a score of 15.33 to 38.83 ($M = 33.15$; $SD = 5.16$), the 313 in the Moderate category ranged from a score of 39 to 44 ($M = 41.83$; $SD = 1.58$), and the 294 in the High category ranged from a score of 44.33 to 49.00 ($M = 46.53$; $SD = 1.45$). For instructional support, the 289 classrooms in the Low category ranged from a score of 4 to 13 ($M = 11.13$; $SD = 1.76$), the 328 in the Moderate category ranged from a score of 14 to 17 ($M = 15.41$; $SD = 1.07$), and the 293 in the High category ranged from a score of 18 to 28 ($M = 20.47$; $SD = 2.15$). (31)

Results

Data Analysis Plan

In order to establish whether instructional and emotional support in the first grade may moderate risk, we first had to establish two preconditions: (1) the existence of a natural experiment, in which children with varying risks backgrounds in kindergarten would sort into first-grade classrooms offering different levels of emotional and instructional support, and (2) whether the hypothesized risk factors were associated with poorer outcomes in first grade. The first precondition was assessed through examining the distribution of children in each risk group into classrooms offering high, moderate, and low support. The second precondition was assessed by conducting ANCOVAs in which risk status was used to predict first-grade outcomes, after adjusting for children’s previous performance on these outcomes measures. (32)

Scientific method: Analysis of the data

- (33) Following these analyses, we turned to answering the main questions of this study: does classroom support moderate children's risk of school failure? First, the instructional and emotional support variables were entered into the ANCOVA models to assess whether classroom support had a main effect on children's outcomes. Next, following the recommendations of Kraemer, Stice, Kazdin, Offord, and Kupfer (2001) regarding testing the moderation of risk, a series of interactions were added to the model to test whether functional and demographic risks were moderated by classroom support variables. The relatively small *ns* among the risk groups provides for unbalanced ANCOVA designs. This situation may inflate Type I errors and thus increase the likelihood that true effects are not statistically significant (Keselman, Cribbie, & Wilcox, 2002). Although not ideal, this analytic approach was determined to be most appropriate for testing the natural experiment described above and provides a stringent test of potential effects for placement in high-quality classrooms. Further details on these analyses are provided below.

Selection into High- and Low-Support Classrooms

- (34) The distribution of classroom support among the risk groups is presented in Table 3. Children displaying high functional risk in kindergarten were as likely as those with low functional risk to be in classrooms offering high instructional or emotional support. Children of mothers with less than a 4-year college degree were somewhat more likely than their peers to be in first-grade classrooms offering low instructional or emotional support. Despite this differential placement based on maternal education levels, there were enough low and high maternal education students placed in each of the three levels of classrooms to exploit a natural experiment. The implication of this differential placement will be considered in the discussion.

Risks as Indicators of First-Grade Achievement and Relational Functioning Achievement

- (35) In order to provide a robust test of associations between risk and outcomes, we adjusted for children's prior scores on outcomes. Descriptive information on both previous and first-grade outcomes are presented for each risk group in Table 1. Consistent with hypotheses, results of ANCOVAs suggest that after adjusting for children's achievement at 54 months, children whose mothers had less than a 4-year college degree and those with high functional risk in kindergarten had lower achievement scores at the end of first grade (see

Table 3

Percentage Placement in First-Grade Classroom Support (Instructional and Emotional) by Risk Status

	Kindergarten functional risk			Demographic risk (maternal education)		
	Low (n = 881)	High (n = 99)	χ^2	Low (n = 661)	High (n = 249)	χ^2
Instructional support						
Low	31.6	33.3	0.28	28.6	40.2	11.76**
Moderate	36.5	32.3		37.1	33.3	
High	31.9	34.3		34.3	26.5	
Emotional support						
Low	32.4	40.4	3.54	29.8	42.6	13.87**
Moderate	35.3	27.3		35.6	31.3	
High	32.3	32.3		34.6	26.1	

p* < .05. ** *p* < .01. * *p* < .001.

Table 4

Results of ANCOVAs Predicting First-Grade Achievement, Controlling for Previous Performance, From Risk and Classroom Process

	Achievement Woodcock–Johnson ^a (n = 908)				Teacher–child conflict ^b (n = 881)			
	Main effects		Moderation		Main effects		Moderation	
	F	Partial η^2	F	Partial η^2	F	Partial η^2	F	Partial η^2
Corrected model	152.17***	.57	78.45***	.58	31.38***	.22	22.03***	.23
Intercept	389.85***	.30	389.39***	.30	415.75***	.32	396.41***	.31
54 months WJ/K conflict	774.03***	.46	789.39***	.47	103.68***	.11	106.14***	.11
Female	12.80***	.01	13.59***	.01	20.77***	.02	20.64***	.02
Risk factors								
Maternal education— some college or less	8.97**	.01	8.335**	.01	0.74	.00	0.77	.00
High functional risk—kindergarten	14.92***	.02	13.20***	.02	23.58***	.03	19.27***	.02
Classroom process								
Instructional support	0.34	.00	0.13	.00	0.03	.00	0.60	.00
Emotional support	1.29	.00	3.20*	.01	2.30	.00	5.69**	.01
Risk × classroom process								
Maternal education × instructional support			6.68**	.02				
Maternal education × emotional support			1.82	.00				
Functional risk × instructional support			1.22	.00			0.69	.00
Functional risk × emotional support			4.57*	.01			3.62*	.01

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4). This suggests that not only do children at risk start school behind their low-risk peers, but the gap increases by the end of the first-grade year.

To test whether these risks may operate differently for boys and girls, interactions between each risk and child gender were initially included in the ANCOVA model. Because none of these interactions were statistically significant at the $p < .05$ level, they were removed from the model. (36)

Relational Functioning

An identical set of analyses was performed to assess children's relational adjustment at the end of the first grade. Risk status was used to predict first-grade teachers' ratings of conflict with children, adjusting for kindergarten teacher ratings on this measure. Children in the high functional risk group had higher levels of teacher-rated conflict at the end of the first grade (see Table 4). Low maternal education did not arise as a significant risk factor for poor relational adjustment. As in the case of analyses on achievement, associations between risk and outcomes were not different between boys and girls and therefore these interactions were not included in the final model. (37)

These analyses provide support for the conceptualization of risk within this study. Even after controlling for previous performance, children at risk were not performing as well by the end of the first grade as were their peers (38)

without these risks, suggesting that these are indicators of increasing gaps between children at risk and those who are not at risk. Furthermore, the analyses provide evidence of the independence of each domain of risk; in the case of achievement, both functional and demographic risk independently predicted poorer outcomes. Only functional risk predicted higher rates of conflict with first-grade teachers.

Role of Instructional and Emotional Support in Moderating Risk Achievement

(39) Results presented in Table 4 suggest that neither support variable had a significant main effect on children’s achievement. Because both risk indicators significantly predicted poorer achievement in the first grade, interactions between maternal education and functional risk status with each of the classroom support variables were entered into the final ANCOVA model. The two-way interactions between instructional support and maternal education and between emotional support and functional risk status both explained significant variance in the final model (Table 4). Effect sizes (partial η^2) were small; however, an examination of the estimated marginal means, presented in Figures 1 and 2, suggests that differences were meaningful, particularly considering that these models controlled for previous performance on very stable measures of academic functioning and are attributable to a relatively short period of time, that is, 1 school year. Figure 1 shows that, consistent with hypotheses, among children whose mothers had less than a 4-year college degree, those in classrooms with moderate and high instructional support had achievement performance in the first grade (controlling for 54-month achievement) equal to their peers whose mothers had more education. In contrast, children at high demographic risk who were in low instructionally supportive classrooms were performing significantly below their peers with low demographic risk.

(40) The main effect for the presence of high functional risk on achievement was moderated by the level of emotional support in the first-grade classroom (Table 4). Among children displaying high functional risk in kindergarten, those who were in highly emotionally supportive first-grade classrooms had similar scores on the first-grade Woodcock–Johnson as did their peers with low functional risk (see Figure 2). Children displaying high functional risk in kindergarten who were in low or moderately emotionally supportive classrooms had lower Woodcock–Johnson scores than did children in the low functional risk group.

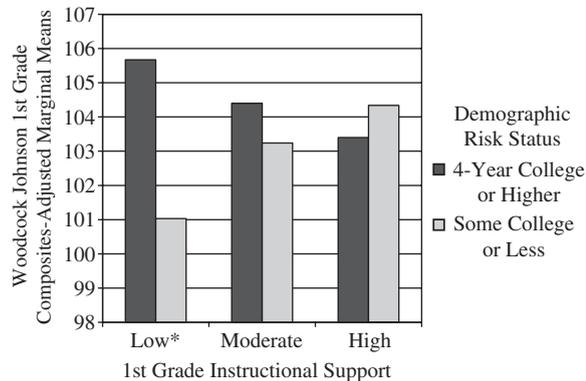


Figure 1. Woodcock–Johnson first-grade composites, adjusted for 54-month performance, by demographic risk status and first-grade instructional support.

* Estimated means at this level have 95% confidence intervals that do not overlap.

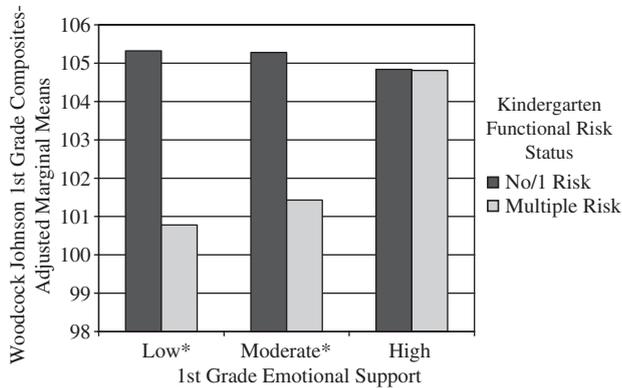


Figure 2. Woodcock–Johnson first-grade composites, adjusted for 54-month performance, by kindergarten functional risk status and first-grade emotional support.

* Estimated means at this level have 95% confidence intervals that do not overlap.

Relational Functioning. As in predicting achievement, classroom support variables did not have a main effect on changes in student–teacher conflict ratings from kindergarten to first grade (Table 4). However, in support of hypotheses regarding the moderating role of classroom process on risk, the interaction between emotional support and child functional risk explained significant variance in the final model. Again, effect sizes (partial η^2) were small. Among children displaying high functional risk in kindergarten, those in highly or moderately emotionally supportive first-grade classrooms had similar levels of conflict with teachers (adjusted for kindergarten conflict levels) as did their low-risk peers, while high-risk children in low emotional support classrooms had higher levels of conflict with teachers (Figure 3).

(41)

Scientific method: drawing and stating conclusions: (1) The study provides evidence that across two important domains of child functioning in the early grades of school, (a) achievement and (b) relationships with teachers, the quality of everyday classroom interactions in the form of instructional and emotional support moderates the risk of early school failure.

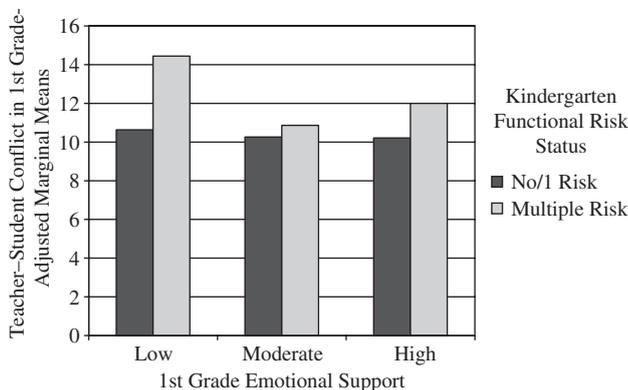


Figure 3. Teacher–student conflict in first grade, adjusted for kindergarten conflict, by kindergarten functional risk status and first-grade emotional support.

* Estimated means have 95% confidence intervals that do not overlap.

Discussion

The current study provides evidence that across two important domains of child functioning in the early grades of school, achievement, and relationships with teachers, the quality of everyday classroom interactions in the form of instructional and emotional support moderates the risk of early

(42)

school failure. In contrast to much of the research on school effectiveness, which has focused on structural indicators of classroom quality such as class size and teacher-student ratio (Rutter & Maughan, 2002), this study adds to the growing body of work documenting ways in which specific classroom processes facilitate children's development (e.g., Connell & Wellborn, 1991; Hamre & Pianta, 2001; Ladd & Burgess, 2001; Morrison & Connor, 2002; Peisner-Feinberg et al., 2001; Stevenson & Lee, 1990; Wentzel, 2002).

(43) Children within this study who were identified as at risk of school failure on the basis of displaying multiple problems within the kindergarten classroom, as well as children whose mothers had less than a 4-year college degree, all displayed lower levels of achievement at the end of first grade than did their low-risk peers, even after adjusting for achievement performance at 54 months. These findings are consistent with others that suggest that children at risk of school failure may fall further behind academically with each successive year in school (Alexander et al., 2001; Entwisle & Hayduk, 1988). Yet not all children displaying early risk displayed academic problems at the end of the first grade, and both instructional and emotional support offered by first-grade teachers may be important in closing the gap in achievement between high-risk and low-risk children.

(44) Consistent with recent views of effective teaching that focus on explicitness and intentionality (Dolezal et al., 2003; Matsumura et al., 2002; Morrison & Connor, 2002), high-quality instructional support in this study was observed when teachers made frequent and effective use of literacy instruction, evaluative feedback, instructional conversations, and encouragement of child responsibility. Among children in this study whose mothers had less than a 4-year college degree, those who were placed in first-grade classrooms offering high-to-moderate instructional support displayed similar levels of achievement at the end of the first grade as their peers with more educated mothers. In contrast, students with less educated mothers who were placed in classrooms offering low instructional support displayed significantly lower achievement at the end of the first grade than their low-risk peers, even after adjusting for prior (54 months) performance on the standardized achievement battery. Thus, just as Morrison and Connor (2002) found evidence that explicit teaching benefited students with reading difficulties more than it did students who did not display these early problems, this study suggests that focused literacy instruction, high-quality feedback, and the engagement of students in discussion of academic concepts may be particularly important in facilitating achievement gains for children with fewer socioeconomic resources. Stevenson and Lee (1990) report the value of similar focused, active teaching for achievement in older elementary students. This finding is also consistent with research on preschool settings, which generally finds the most significant cognitive effects of high-quality child care among children of fewer socioeconomic resources (e.g., Peisner-Feinberg & Burchinal, 1997), but is among the first to document a similar effect for natural variation (i.e., not the consequence of targeted interventions) in instructional processes in elementary classrooms. That effects on achievement were attributable to instructional support for children in the low maternal education group may reflect compensation for lower levels of language stimulation and experiences with learning materials often reported in lower socioeconomic groups (Alexander et al., 2001; Hart & Risley, 1995).

(45) Among children at high functional risk (those who displayed some combination of early behavioral, attentional, social, and/or academic problems), academic achievement in the first grade was highest for those in classrooms offering high emotional support. In these classrooms, teachers were aware of and responsive to individual students' needs, offered effective and proactive behavior management, and created a positive classroom climate in which teachers and students enjoyed each other and their time in the classroom. High functional risk children in these emotionally supportive

classrooms had similar scores on the first-grade Woodcock–Johnson as their low functional risk peers, while high functional risk children in classrooms offering low or moderate emotional support displayed significantly lower levels of achievement than did their low-risk peers. Academic performance for students at high functional risk was not significantly moderated by the level of instructional support in the classroom. This finding is consistent with other work indicating that among children who have displayed difficulties adjusting to the classroom environment, having teachers who attend to their social and emotional needs may be as or more important to academic development than specific instructional practices (Burchinal et al., 2005; Hamre & Pianta, 2001; Noam & Herman, 2002; Pianta, 1999; Wentzel, 2002).

Theories seeking to explain the potential mechanisms of this connection between students' social and academic lives include social-motivation theories as well as work on student–teacher relationships. Wentzel (1998, 2002) has argued that positive interactions with teachers and peers can increase students' motivation and pursuit of academic goals. In this view, students who see teachers as supportive are more likely to pursue goals valued by teachers, such as engagement in academic activities. Consistent with this view is work on student–teacher relationships, which has suggested that stressful aspects of students' relationships with adults can lead to lower classroom participation and achievement (Ladd, 1989), while supportive relationships can help engage students in school (Furrer & Skinner, 2003). The current study extends these findings by suggesting that naturally occurring variation in teachers' emotional support can be important in enabling some children to make academic gains in early elementary school. (46)

Beyond academic achievement, children's ability to develop a strong relationship with their teachers, characterized by low levels of conflict, is a key indicator of positive school adjustment both concurrently and in the future (e.g., Hamre & Pianta, 2001; Ladd & Burgess, 1999; Ladd et al., 2002). This study provides evidence that for children who struggled in the prior year, their risk of developing conflictual relationships with teachers in the first grade is moderated by the quality of emotional support they received within their first-grade classrooms. Arnold, McWilliams, and Arnold (1998) have described ways in which interactions between teachers and children may resemble the coercive cycles between parents and children studies by Patterson and colleagues (Patterson & Fisher, 2002; Reid et al., 2002), with child misbehavior being influenced by and resulting in less positive interactions with teachers. Therefore, it is not surprising to find that, consistent with previous studies (Ladd & Burgess, 1999), children who have displayed multiple indicators of functional problems in kindergarten were more likely to develop poor relationships with teachers in the first grade. But when these children displaying high functional risk were placed with teachers offering high-to-moderate levels of emotional support, they did not differ significantly from their better-adjusted peers in levels of teacher-reported conflict. In contrast, children displaying high functional risk in kindergarten who were placed in classrooms characterized by low emotional support appeared to be particularly vulnerable to developing conflictual relationships with teachers in the first grade. This finding underscores the important role that teachers may play in interrupting cycles of coercive interactions with students (Arnold et al., 1998) and teacher–child relationships as a particularly important asset for children with social or relational challenges (Gregory & Weinstein, 2004; Noam & Herman, 2002). Future research may examine whether children at risk who are able to develop positive relationships with teachers show fewer behavioral and social problems in later school years. (47)

There are several notable limitations to this research resulting from the fact that it was conducted using a large, existing data set, rather than data developed specifically to address the research questions. Most notably, (48)

although this study successfully identified children at risk of school difficulties, the fact that the overall sample was not highly at risk constrains our ability to generalize findings and may have led to smaller effect sizes than would be observed in a more highly at-risk sample. These results need to be replicated among other high-risk groups before more conclusive statements regarding the role of instructional and emotional support in moderating risk of school failure can be made. Secondly, the global composites used to define classroom process prohibit more specific statements about the types of interactions between teachers and children that may moderate risk. Global measures offer the benefit of allowing a more simplified characterization of classroom quality, but limit our understanding of the specific interactional processes that may be most important in classrooms.

- (49) Among their methodological recommendations for studying environmental effects on children's outcomes, Rutter and Maughan (2002) suggest directly testing competing hypotheses. One competing hypothesis not tested within this study concerns the direction of causality. This is a particular issue in the analysis on functional risk, as it could be argued that children displaying more behavioral, attention, academic, and social problems draw different types of interactions from teachers (e.g., Arnold et al., 1998). Although there was evidence that first-grade classroom support was independent of students' functional risk status, it is possible that children who ended up in first-grade classrooms offering higher support had made positive gains in the period not measured, between fall of kindergarten and the beginning of first grade. Having multiple measurements within each school year would enable more careful analysis of change across time.
- (50) Taken together, these findings provide evidence of the potential for schools to moderate children's risk of academic and relational problems. Although the effect sizes are small, the findings are notable given that these effects (a) were not because of a focused intervention but rather because of natural variation in everyday interactions, as observed on only 1 school day; (b) were observed over a relatively short period of time (1–2 years); and (c) were controlled for previous functioning on outcomes known to have high-to-moderate stability. Unfortunately, although these findings suggest possible pathways to reduce gaps between children in school performance, recent evidence suggests great variability in the quality of classroom environments as well as in the stability of quality from year to year, even within the same school (NICHD ECCRN, in press). If children are not systematically exposed to high levels of classroom support across time, the effects of such positive placements are likely to be short-lived. This is particularly concerning given the finding that students with lower levels of maternal education tend to be exposed to lower quality classroom environments.
- (51) Just as developmental psychopathology has focused on using knowledge about underlying processes of adaptation to inform clinical practice (Hinshaw, 2002), school and educational psychologists, as well as developmental psychologists interested in school settings, would benefit from an increased focus on the processes underlying children's school adaptations (Pianta, in press). Research on these processes may be used to inform school-based interventions at the individual level, through working with teachers to improve the quality of their interactions with a specific student (e.g., Ladd et al., 2002; Pianta & Hamre, 2001), or at a more global level, through providing schools with professional development and measurement tools based on strong empirical evidence connecting specific classroom processes to more positive child outcomes. Furthermore, as school-based prevention and intervention efforts increasingly target improvements in the social and emotional climate of classrooms and schools as a means of facilitating children's development across academic, behavioral, and social domains (Greenberg et al., 2003), inclusion of measures of observed classroom processes will continue to expand our knowledge about specific classroom

processes that are amenable to change and are associated with more positive outcomes for students.

Finally, from a theoretical perspective, the results of this study provide evidence of the benefit of understanding schools not only as a place to measure children's outcomes, but as an important context for children's development (Connell & Wellborn, 1991; Eccles, 1993; Pianta, in press; Roeser et al., 2000). Modeling the ways in which school experiences can add to, mediate, and moderate established trajectories of development allows for a more comprehensive understanding of children's adaptation (Cicchetti & Aber, 1998). Absent information on the process of schooling, and it is difficult to evaluate the legacy of early experience in the light of the possibility that school experience mediates or moderates the effects of prior history or concurrent experience at home. Given increasing evidence of the contribution of classroom process to school-age outcomes in the short term (e.g., Brody, Corsey, Forehand, & Armisted, 2002; Morrison & Connor, 2002; NICHD ECCRN, 2002b; Pianta et al., 2002; Rimm-Kaufman et al., 2002), not modeling such effects could lead to overestimating the linear, direct association between early experience, and children's long-term outcomes. Integrating methodologies for measuring classroom process in programs of longitudinal research, conceptually and functionally, is essential to the advancement of increasingly comprehensive models of development.

Classification of research by purpose:
Basic research to develop and refine
theories of children's adaptation.

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TASK 1B Qualitative Example

Developing Teacher Epistemological Sophistication About Multicultural Curriculum: A Case Study

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ABSTRACT Teachers are significant curriculum decision makers in their classrooms. How does teachers' thinking about curriculum develop in the context of teacher education coursework, and how might an analysis of a novice teacher's learning to think more complexly inform teacher education pedagogy? This article presents a case study of a 2nd-year teacher who was in a graduate-level Multicultural Curriculum Design course, which was designed to develop the complexity with which teachers understand and plan curriculum. Data—which included student papers, a reflective journal, classroom observation of the teacher, and an interview—are analyzed using a rubric that differentiates novice, developing, and accomplished teachers' thinking about multicultural curriculum.

- (01) Teachers are significant curriculum decision makers in their classrooms, although curriculum is given far less attention in professional development for novice teachers than are other classroom concerns (Clayton, 2007). How does teachers' thinking about curriculum develop in the context of teacher education coursework? And how might an analysis of a novice teacher's learning to think more complexly inform teacher education pedagogy? This article presents a case study of a 2nd-year teacher who enrolled in my graduate-level Multicultural Curriculum Design course, which was designed to develop the complexity with which teachers understand and plan curriculum. As a teacher educator, I attempt to (1) disrupt common novice assumptions that there is a "right" way to design and teach multicultural curriculum and that there is a body of "correct" knowledge and attitudes to teach and (2) help teachers develop more sophisticated epistemological perspectives about the nature of knowledge and their work as teachers. This case study teases out factors that appeared to prompt the growth of one teacher.

Teachers' Epistemological Beliefs

- (02) Working with multiple perspectives, frames of reference, and funds of knowledge is at the heart of designing and teaching multicultural curriculum (Banks, 2004). Developing curriculum that is intellectually rich and relevant to diverse students, in contexts already furnished with a fairly prescribed curriculum, requires teachers to judge what is most worth teaching and learning and to identify space in which they can invite students' knowledge and interests. Making such judgments requires evaluating knowledge in terms of its socio-political moorings and intellectual basis. These are issues of epistemology—beliefs about how people know what they know, including assumptions about the nature of knowledge and the process of coming to know (Clayton, 2007).

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Schommer (1990) describes three epistemological dimensions of knowledge that have relevance to teachers: certainty, source, and structure. *Certainty* refers to the extent to which one sees knowledge as being based on a fixed reality that is “out there” and unchanging. *Source* refers to where valid knowledge can come from (established external authorities, personal experience, etc.) and how one evaluates the relative strength of various sources and forms of evidence. *Structure* refers to the extent to which one sees knowledge as having, on one hand, its own internal structure and hierarchy or, on the other, an organic relationship to context, knowers, and everyday life. Research on teachers’ and college students’ epistemological beliefs suggests growth along a continuum (Schommer, 1998; White, 2000). At one end are those who hold absolutist beliefs, seeing knowledge as being fixed and certain, outside the knower, and established by authority figures. At the other end are reflective individuals who see knowledge as being situated within the context in which people create it: Problems have multiple solutions, and truth claims can be evaluated on the basis of the veracity of evidence on which they rest. In the middle are relativists, who reject anchoring knowledge in established authorities but, not knowing how to evaluate it otherwise, assume that all perspectives are equally valid. (03)

Assumptions that teachers make about the certainty, source, and structure of knowledge affect what they do with curriculum in general and multicultural curriculum in particular. Powell (1996) compares how two teachers with different epistemologies approached multicultural curriculum. One teacher held a developmentalist approach, seeing students’ needs and interests as the basis on which academic knowledge should be built. The other saw the structure of his discipline (science) as being fundamental, and he judged students’ learning abilities in relationship to their mastery of disciplinary content. The first teacher saw multicultural curriculum as being relevant; the second did not. (04)

So, to help teachers plan and teach intellectually sound multicultural curriculum that engages their students, one should prompt them to question their beliefs about the certainty, source, and structure of knowledge. Teaching a course in higher education, I have 15 weeks in which to do this—a relatively short time in which to disrupt assumptions built over many years of experiencing conventional schooling. (05)

The purpose of this case study was to examine the relationship between a teacher’s learning and my teaching strategies in the university, as coupled with visitation to the teacher’s classroom. (06)

The scientific method—selection and definition of a problem: “to examine the relationship between a teacher’s learning and my teaching strategies in the university”

Methodology for a Case Study

According to Stake (2000), “a case study is expected to catch the complexity of a single case” (p. xi). Stake maintains that case study research is useful to education because, although school settings, teachers, and students share similarities, they are unique and complex. We cannot fully understand shared patterns without seeing the uniqueness of individual cases. (07)

This case study is drawn from a larger study of teachers working with multicultural curriculum (Sleeter, 2005). Why did I select Ann (pseudonym) for a case study? Stake (2000) recommends selecting cases that “maximize what we can learn” (p. 4). Beginning teachers in racially or ethnically diverse classrooms are commonly involved in induction programs and thus of interest to many teacher educators (Achinstein & Athanases, 2005; Chan & East, 1998). (08)

Case study research is focused on a “unit of study” or “bounded system,” that is, a beginning teacher new to multicultural education.

Therefore, I wanted to focus my attention on a beginning teacher who was relatively new to multicultural education, open to learning, and teaching in a diverse classroom. Of the teachers in my course (veterans as well as new teachers, in varying classroom settings), Ann best fit these criteria. She was a 2nd-year teacher who had moved to California from the East Coast about 2 years previously. A young White woman, she taught fifth grade in an (09)

Applied research focused on how a beginning teacher integrates university coursework on multicultural education into her classroom teaching and the decision-making process related to the implementation of a multicultural curriculum.

Scientific method: execution of research procedures: (1) sample selection, (2) curriculum unit, (3) journal, (4) field notes, and (5) interviews.

elementary school that serves a diverse, largely low-income student population. She expressed interest in multicultural education, even though it was new to her.

(10) Case study research typically uses a variety of methods to collect data, with an objective toward triangulating findings across methods (Creswell, 2008; Stake, 2000). Data for this study included (1) several papers that Ann completed during the course, including a unit that she designed as a course requirement, (2) a journal that I kept after each class session, (3) notes on two observations of Ann teaching the unit that she designed after the course had ended, and (4) a 40-minute tape-recorded interview with Ann following my observations.

(11) As a heuristic tool for reflection and analysis, I developed a rubric that appears in Table 1, which describes a rough progression of levels in learning to think complexly about multicultural curriculum at novice, developing, and accomplished levels. In developing the rubric, I drew from research comparing teachers' thinking at novice, developing, and expert levels, which

Table 1

Thinking Complexly About Multicultural Curriculum

Task definition

Novice. Assumes a “right” way to design and teach curriculum. Assumes that one already understands multicultural curriculum and that “new learning” involves adding onto that. Ignores, sees as irrelevant, or lacks confidence to examine what puzzles, feels threatening, or seems impractical.

Developing. Recognizes more than one “right” way that good curriculum could be designed and taught. Willing to question things that one thought one understood and to explore dimensions that are puzzling or new.

Accomplished. Assumes that multiple ways of designing and teaching curriculum emanate from diverse ideologies; able to own and work with one’s ideology. Continually tries to recognize new dimensions of curriculum and to figure out the most ethical and practical balance among competing demands.

Perspective taking

Novice. Assumes there is a body of “correct” knowledge or attitudes to teach; tends to interpret and dismiss other perspectives or critical questions as opinion, personal criticism, or simply impractical.

Developing. Willing to consider multiple and possibly conflicting definitions of what is most worth knowing; able to acknowledge how one’s viewpoint, identity, and social location shapes one’s perspective; willing to own one’s judgments about what is best.

Accomplished. Actively seeks multiple perspectives; makes explicit effort to learn from perspectives different from one’s own, especially those that have been historically subjugated. Able to articulate own perspective as one of many; able to invite dialogue and discussion across divergent perspectives.

Self-reflexivity

Novice. Strives for certainty, assumes that questioning oneself is the same as questioning one’s competence; seeks approval for one’s thinking from authority figures.

Developing. Willing to acknowledge uncertainty, at least tentatively; occasionally asks what is most worth teaching and why; recognizes need to attend to practical consequences of one’s teaching while maintaining some level of critical questioning.

Accomplished. Views uncertainty as tool for learning. Consistently monitors, questions, and evaluates practical and ethical impacts of one’s work on students. Questions how one’s own positionality, experiences, and point of view affect one’s work but can move forward while doing so.

Locus of decision making

Novice. Either looks to external authorities (such as the state, well-known people in the field, texts) to find out what and how to teach or ignores them entirely; assumes that educational decision making flows top-down.

Developing. Attends to external authorities but also willing to seek input from students, parents, community members, or other teachers; explores how to make decisions in a way that satisfies authorities and invites bottom-up input.

Accomplished. Negotiates decision making in a way that consciously places well-being of students at the center; regularly engages students and their communities in collaborative decision making while attending to external expectations; able to take ownership for the consequences of one’s decisions.

generally finds that expert teachers, compared to novice teachers, make more distinctions among aspects of curriculum and instruction and bring to bear more elaborated thinking about their judgments (e.g., Cushing, Sabers, & Berliner, 1992; Krull, Oras, & Sisack, 2007; Swanson, O'Connor, & Cooney, 1990). I also drew from my experience planning and teaching multicultural curriculum, as well as collaborating with several colleagues who were investigating the development of cognitive complexity among their students.

The rubric includes four dimensions along which epistemological beliefs can be examined: task definition, perspective taking, self-reflexivity, and locus of decision making. Assumptions labeled *novice* correspond to what White (2000) characterizes as absolutist thinking. Those labeled *developing* correspond to relativist thinking, and those labeled *accomplished*, to reflective thinking. I used the rubric to guide my analysis of the case study data (presented later). I also used it with teachers in the Multicultural Curriculum Design course as a reflective tool. Ann used the rubric in a paper to reflect on her own growth, which I read after I had made my preliminary analysis of her growth. Her self-analysis was quite similar to mine. Ann also read an earlier draft of this article, offering a few comments while confirming its consistency with her analysis of her growth. (12)

Case Study of Ann

Ann had enrolled voluntarily in Multicultural Curriculum Design. When I asked how she came to be interested in it, she replied, (13)

I [student-taught] in Eastern London; it was all primarily Afghani and Pakistani descent students. And I was just fascinated with the Arabic that they spoke and the writing and it was so different...

And when I came home, I taught this fifth grade about the cultures I learned over there, and they had no idea what Arabic was, what Muslim, what Mohammed, nothing. And I think it's really important to teach about the different cultures and religions. I think a lot of times ignorance brings hate. (January 28, 2004)

On the 1st day of the course, I asked teachers to write their definition of *curriculum*. Ann wrote, "Curriculum is what the teacher is required to teach to the students" (September 8, 2003). About 3 weeks later, I had them write about the extent to which their curriculum is determined by authorities such as the state and about any concerns that they might have about what they are expected to teach. Ann wrote, (14)

I have concerns with teaching the history textbook content. As a public school teacher, though, you really can't go outside of your prescribed literature and academic standards. So, I believe at this moment that it is my job as a teacher to try and guide the students to question and look at the text differently than what they read in the chapter...So, the dilemma is how to tactfully incorporate other multicultural views in a school-adopted textbook and be able to cover all the standards the state and government expects of you at the same time. (September 30, 2003)

These responses suggest that Ann entered the course with an absolutist perspective about curriculum. A novice, she accepted the legitimacy of external authorities to determine curriculum; she believed that she could tweak it a bit to make it multicultural; and she was looking for strategies and ideas to use. (15)

My task, however, was not to simply offer her strategies and ideas but to slow down her learning process so that she could reflect more deeply on her beliefs and assumptions. Throughout the semester, I used various strategies to do this: analyzing epistemological and ideological assumptions in documents, reading works that reflect multiple ideological perspectives, engaging (16)

in personal interactions that challenge thinking, engaging in reflective writing, and developing a curriculum unit one can teach. I examine these in relationship to Ann's growth.

Analyzing Epistemological and Ideological Assumptions in Documents

- (17) Early in the semester (September), I guided teachers in analyzing epistemological assumptions in various documents related to curriculum, such as curriculum standards and school reform proposals available on the Internet. Teachers examined documents in relationship to questions such as the following: *Who produced this document (if it is possible to tell)? How is it intended to be used? By whom? What is its purpose? Whose view of the world does it support? Whose view does it undermine or ignore? Whose knowledge isn't here?* In addition, they analyzed textbooks from their classrooms, with guidance from a textbook analysis instrument (see Grant & Sleeter, 2009).
- (18) Ann elected to analyze her social studies textbook. As she explained near the end of the semester, this analysis caused her to realize that

history is told overwhelmingly in the white European male perspective....The history text teaches the story of American history as "We the People" as a succession. All the chapters from 30,000 B.C. to 1600 are never rethought after colonization....The broader ideology that is being supported in the text is that it is natural for Europeans to succeed prior races without accepting or studying their culture. (December 8, 2003)

- (19) She coupled this analysis with interviews with some of her students, for another short paper. She asked her students what they knew about indigenous people of the United States and the history of colonization. She was surprised to discover that they thought that there are no Native Americans left. Ann discovered that "they knew very little about the colonization period of the United States. Looking at my student perspectives paper, the pieces of information that they did know were mostly filled [with] myth and false facts" (December 15, 2003).

Scientific method: analysis of data. This is an iterative process in case study research that involves the analysis of qualitative data and leads to statements of the themes that have emerged from the data.

- (20) Coupling document analysis with student interviews helped Ann see that U.S. history is told from a perspective that excludes indigenous perspectives; as a result, her students were coming to believe that indigenous people no longer exist. By October, Ann began to question her earlier assumption that a teacher's job is to teach what the state demands.

Reading from Multiple Ideological Perspectives

- (21) Readings that engage teachers with various ideological perspectives can prompt reflection when used in conjunction with discussion and reflective writing. To that end, we read Macedo's *Literacies of Power* (1994), which examines curriculum, ideology, and power from a critical ethnic studies perspective, and we read online selections from *Rethinking Schools* (rethinkingschools.org), a newspaper written from critical perspectives, mainly by classroom teachers. The readings offered a language that many of the teachers had not previously encountered.
- (22) As Ann read *Literacies of Power*, she made connections between its critique of schooling and her own belief system. She wrote that she is a registered Democrat with leanings "toward liberal, green, and democratic ideals"; she also described her coteachers as dismissing conspiracy theories and as being attached to "their Republican government and books and standards" (October 13, 2003). She was not put off by Macedo's radical questioning of dominant beliefs about schools, because his questions supported her disagreements with coworkers and her new awareness that history texts reflect dominant points of view. At the same time, she realized that she did not

understand some of Macedo's ideas. Halfway through the semester, in a class discussion, Ann commented that after listening to classmates of color, she better understood Macedo's ideas.

Her reactions to Macedo suggest that Ann sought connections between his ideas and life experience—her own and that of people whom she knew. Because she was able to make those connections, she gradually took up questions that he raised about how dominant groups shape what happens in schools. By November, she was interested in connecting his analysis of power and curriculum with global power. Ann participated in a small-group discussion of an article in which a fifth-grade teacher describes how he helped his students develop a sense of solidarity with struggles of workers across the globe (Peterson, 2000/2001). Ann asked me what the term *globalize* means, whether it is positive or negative. I explained that the author was referring to the process of large corporations' incorporating Third World economies into a capitalist global economy. Ann commented that she was not sure what the term meant. Two weeks later, she wanted to discuss this article, along with another (Bigelow, 2002) that examined how school knowledge constructs Third World peoples from highly Westernized points of view rather than from Third World points of view. These seemed to be new ideas that she wanted to further explore because they appeared to resonate with her political beliefs and, possibly, with her student teaching experience. (23)

To acquire background for a curriculum unit that was the course's culminating project, teachers were to identify a concept that they could teach, and they were to research it from points of view found in the intellectual scholarship of one historically marginalized group. In early October, as Ann became aware that her textbook virtually ignores indigenous people and the impact of colonization on them, she decided to pursue the topic of colonization from indigenous perspectives. She initially suggested starting with the question, what are Native American perspectives on colonization? I advised that she narrow her question to a specific period, place, and tribe or nation; she decided to focus on the Iroquois during the 17th century. Over the next 2 months, she read *Lies My Teacher Told Me* (Loewen, 1995) and *Rethinking Columbus* (Bigelow & Peterson, 1998), as well as work by indigenous authors such as LaDuke (1999) and Churchill (2002). As she read, she focused on the Haudenosaunee (Iroquois), Wampanoag, and Pequot during the late 17th century. She came to see that books by indigenous scholars present an opposing perspective from that in the school's history text. She was initially confused, commenting in class, "Topics just kept spinning off each other and it was hard to stop or to figure out what to actually use" (journal notes, December 8, 2003). She struggled with how to rethink her curriculum because she realized that she could not simply add information to it. Later I show how she resolved this dilemma. But it was clear to me that readings grounded in a different perspective prompted her over the semester to recognize and question the perspective in her curriculum and textbooks. (24)

Engaging in Personal Interactions

Throughout the semester, I had teachers engage in various structured and semistructured interactions to simulate their thinking and self-analysis. The fact that they were from diverse backgrounds produced rich discussions all semester. They were mainly women. About one third were White; one third, Latino; and the rest included an African American, a Korean, two Africans, two Greeks, and some biracial students who identified as Asian American. (25)

A powerful interaction involved sharing from each teacher's life. They were asked to bring one or two objects that reflect membership in a socio-cultural group (e.g., based on race or ethnicity, gender, sexual orientation, (26)

language) and a struggle for rights or identity related to membership in that group. The objects should prompt sharing about how they have claimed identity, space, and rights (Flores, 2003). Ann is of Italian American descent, as were several other teachers in the class. They discussed the centrality of food to family gatherings and the position of women in traditional Italian families (as well as Mexican families). Ann discussed being a vegetarian, which her family saw as a rejection of Italian food and family; she had struggled to help her family see that one can be an Italian vegetarian. Although her struggle was less intense than those of some of the teachers of color, it gave Ann a basis for hearing where others were coming from. After this session, she commented that Macedo's critique of schooling in the U.S. made more sense to her.

Engaging in Reflective Writing

- (27) Throughout the semester, teachers wrote reflections about various teaching dilemmas that they had experienced, such as how they handled conflicts between the demands placed on them as teachers and their political or pedagogical beliefs. Ann found that reflective writing enabled her to link insights from readings with some of her core beliefs about schooling that conflicted with what she was told to do.

- (28) In one reflection, teachers were to identify and analyze a teaching practice that they favored and had tried but that did not work or was rejected by their students. Ann wrote about her experiences using small-group activities:

The students did not respond to my group activities as well as when practiced in my student teaching. When given manipulatives in math, they were thrown sometimes. In language arts we worked in writing workshop groups, and more times than not there were disagreements and fights. The science experiments resulted in many referrals and suspensions. (November 3, 2003)

- (29) Her new-teacher mentor told her that she was giving the students too much freedom, "that this kind of population needs seatwork and a definite routine every day.... As a result, I backed off on these activities and have a whole class teaching method instead of learning centers." On reflection, Ann realized, "I gave up too easily." She went on to write,

My theory on this is that students tend to talk out and voice expressions when interested in a certain subject matter.... I feel that some cultures need to be heard, literally, more than others. The quote from Macedo "education so as not to educate" makes me think, is this the type of teaching that I've adopted from my mentor, just silencing students that probably need to speak out? My dilemma here is how to have a classroom where students speak out, learn in different ways and in group settings, without having troublesome discipline problems. (November 3, 2003)

- (30) For Ann, writing reflectively about the intersection between her experiences, beliefs, readings, and discussions seemed to prompt self-analysis. In the process, she questioned the basis on which experienced teachers recommended teaching practices, seeing limitations in her coworkers' advice and reclaiming her beliefs about teaching and learning.

Developing a Curriculum Unit

- (31) The course is organized around a culminating assignment: developing a multicultural curriculum unit that one can actually teach. I use this assignment to provide teachers with a way of working through the questions, dilemmas, and new insights they grapple with over the semester. As noted earlier, Ann grappled with two major problems: how to address the fact that "indigenous

people's history stops after Columbus is introduced" (December 8, 2003) and how to engage students in active learning without losing control over the class.

To resolve the problem of how to teach history from two opposing perspectives, Ann used a teacher's suggestion of organizing the unit around a trial. It focused on the Wampanoag nation's frustrations with colonists who were misusing natural resources—particularly, overkilling the deer population. It was based on the Haudenosaunee Great Law of Peace and Good Mind, which uses a trial process as a tool for building consensus about solutions to community problems. The trial structure helped her figure out how to engage students in active learning. (32)

To prepare this unit for teaching, Ann needed to learn a good deal more. For example, it was not enough to know that the Haudenosaunee had a well-developed democratic governmental and legal system; she also had to be able to accurately describe some of its features. She commented on the amount of time that it took her to research background material: (33)

Just when I was planning this lesson, I went and spent another few hours finding those words and finding all the Native American names....I spent time on Native American websites. And researching this is something I'm kind of interested in. I mean, I've looked up some different Native American beliefs and traditions just for my own personal knowledge. (interview, January 28, 2004)

As a 2nd-year teacher, Ann was overwhelmed with preparing lessons for state standards in all the content areas. She recognized that preparing such a unit entailed work above and beyond that required by the state curriculum. Because Native Americans disappear from the social studies curriculum as it traces the story of Europeans and Euro-Americans, she could elect not to teach the unit and be in full compliance with state requirements. But she believed that the unit was too important to drop. (34)

Ann's completed unit included three 45-minute lessons. I visited her classroom in January while she was teaching the second and third lessons. During the third lesson, students role-played the trial, which Ann entitled "The Case of the Missing Deer." In a fictitious trial set in Massachusetts during the 17th century, the Wampanoag tribe sued the European colonists for misusing natural resources. Ann had given each student a role card that included a name, a designation as a Wampanoag or colonist, and role in the trial. She showed who would sit where: defendants at one table, plaintiffs at another, jury at another table, and judges at the circular table at the front (there were five judges: two colonists, two Wampanoag, and one from another tribe who would act as a tiebreaker, if needed). Ann directed everyone into his or her place, then passed out worksheets appropriate to each role. When students received their worksheets, they started filling them out. Ann stressed the need for quiet in the courtroom; the students looked very engaged, with only a little fidgety off-task behavior. (35)

Then the trial started. The Wampanoag witnesses were followed by colonist witnesses. Most students stuck to the lines on their role cards, but a few knew their lines and extemporized. After witnesses for both sides had testified, additional witnesses contradicted some of the testimony. Then Ann took the jurors out of the room and gave them 2 minutes to render a verdict. While they were deliberating, she had the rest of the class finish answers on their worksheets. The jury returned and found the colonists guilty. (36)

The judges then left the room to deliberate sentencing. While they were out, Ann asked the colonists what they thought about the verdict. When a boy suggested planting vegetables, Ann pointed out that the colonists came from England and probably did not know what would grow in Massachusetts. After a small amount of silliness, the children started (37)

constructive brainstorming, such as suggesting that the colonists could learn from the Indians what grows in the local geography. The judges returned, sentencing the colonists to share all the deer with the Wampanoag people for 2 years. Ann led a whole-class discussion of the trial and verdict, asking students to consider whether the decisions were fair. She also asked students to consider whether the Native Americans would teach the colonists how to hunt deer without killing them off.

- (38) When I interviewed Ann after the unit had concluded, I realized that she was not yet connecting students' engaged behavior with her careful planning for their active involvement. While teaching, she usually expended considerable energy keeping students on task, but during the simulation, she did not need to do so. She initially attributed their on-task behavior to external factors such as the weather, but by prompting her to reflect on the structure of the unit, I helped her see how her planning offered students a way to become involved and interested in the academic lesson.

Implications for Teacher Education

- (39) Over a 5-month period, Ann moved from a novice level to a developing level in planning multicultural curriculum. She no longer defined the task of curriculum design as finding the "right" way; rather, she sorted through multiple possibilities to plan curriculum that embodied more than one perspective. She no longer accepted the authority of the state and the textbook companies to define what to teach; rather, she considered the scholarship of indigenous people, the perspectives of students, the experiences of teachers of color, and her own experiences with culture and gender. She was supported in working with uncertainty and investing time in reading and thinking to make decisions that she could defend. Her growth, with the kind of support that she received, was similar to that documented in other studies of new teachers in urban schools, in which coursework and mentoring challenge beginning teachers' beliefs—particularly, those related to race, ethnicity, and poverty—focus on pedagogy, and examine tensions between perspectives of new teachers and responses of their students (Achinstein & Athanases, 2005; Chan & East, 1998).
- (40) By carefully reflecting on Ann's learning in the context of my teaching, I learned that the following can help guide teacher educators: First, reflective discussions and writings, as embedded in teachers' classroom work, prompt thinking that can dislodge novice assumptions (Clayton, 2007; Krull et al., 2007). This was a graduate course for practicing classroom teachers; as such, the document analyses, reflective writings, and personal interactions asked them to reflect on their work. For Ann, continued connection between the course and her everyday teaching was fruitful. Analyzing one of her textbooks and interviewing her students prompted her realization that state-defined knowledge assumes a perspective that needs to be questioned. This realization caused her to question where curriculum decision making should be located. Furthermore, the reflective writings helped Ann to name some of her questions and struggles, such as how to build active engagement without losing control over the class.
- (41) Second, to facilitate development beyond novice thinking, it is essential to provide space and support for uncertainty. Ann brought a capacity to self-reflect and live with uncertainty; I could not give her this capacity, but I could work with it. In addition to encouraging reflection in written work and discussions, I made a reasonable attempt to allow students to wonder, to make statements that could be considered naïve, and to disagree with one another and with me. As I examined the journal that I had kept over the semester, I identified Ann's expressions of uncertainty all semester, as

well as evidence of her pursuit of questions that interested her. Sometimes in multicultural education courses, students feel shut down and unable to say what they think for fear of offending other students or the professor. This case study shows how important it is to work on creating a climate in which students can ask questions, express their thoughts, and disagree, as long as they do so respectfully. Without creating space for uncertainty, as well as support for questioning and disagreeing, it is unlikely that an instructor will help teachers develop epistemological sophistication.

Third, teachers value opportunities to learn from peers in contexts of guided inquiry (e.g., Jennings & Smith, 2002). I had structured the course to provide multiple opportunities for peer learning, particularly inviting novice teachers to learn from more-experienced teachers. In addition to having regular small-group discussions that asked teachers to link readings with their teaching experience, I used many readings written by classroom teachers (articles from *Rethinking Schools* in particular), and I invited an experienced multicultural educator as a guest speaker. These opportunities helped Ann to envision viable possibilities for teaching, which broadened her definition of the task of multicultural curriculum design. In a reflection paper, for example, she mentioned that some of the readings from *Rethinking Schools* had been especially helpful to her because they linked political issues with real-world classroom teaching. It appeared to me that opportunities to learn from more-experienced teachers helped novice teachers such as Ann to see possibilities that they might not otherwise see.

Opportunities to learn from perspectives across racial, ethnic, and cultural boundaries stretched teachers' beliefs, sometimes painfully. As mentioned earlier, the teachers in the course were highly diverse; there was no racial or ethnic majority. Furthermore, I chose readings to reflect points of view usually absent or silenced in predominantly White, mainstream contexts. Many class sessions provided various kinds of opportunities for teachers to dialogue about their diverse life experiences and to reflect on their experiences in relationship to people of backgrounds different from their own. Some of these discussions became heated and painful; as instructor, my role was to organize such discussions, then to mediate as needed. For Ann, the process of learning across cultural boundaries enabled her to reject her coworkers' beliefs that "this kind of population needs seatwork" and to hear Macedo's (1994) assertion that students such as those in her classroom need an education that enables them to think and speak out. As she read viewpoints of indigenous writers, she briefly experienced a crisis: She recognized that there is no one "correct" body of knowledge to teach; she then gradually took responsibility for trying to make multiple perspectives visible in her curriculum. The process of hearing perspectives across cultural boundaries also helped her to see the limitations in her textbook's point of view and summon the time and energy to construct an alternative.

Deepening teachers' epistemological thinking in one course is a challenging task. Teacher education courses generally last 10 to 15 weeks, and they are usually located on the college campus rather than in the classrooms where teachers work. Both conditions limit the potential potency of course-work. Because of her participation in this study, I maintained a relationship with Ann after the course had ended in order to visit her classroom. There, I was able to offer guidance and coaching—particularly, reflection about the unit's structure and how it increased students' engagement and decreased discipline problems. This study emphasizes the extent to which teachers weigh the viability of new insights in relationship to their feasibility and their impact on students in the classroom. Rather than plan discrete courses for the development of teachers' epistemological complexity, we should plan entire teacher education programs to that end.

Conclusion

Scientific method: drawing and stating conclusions.

- (45) In today's standards-based context, schools tend to reinforce novice assumptions about knowledge by defining what to teach and expecting teachers to accept the state as the main authority over knowledge. When I teach, I intentionally disrupt that expectation, tapping into historically marginalized points of view about what is worth knowing and into teachers' beliefs about what schooling could be. As Clayton (2007) argues in her case studies of beginning teachers, teachers ultimately need to figure out how to resolve tensions between (1) an institutionalized press toward standardizing knowledge and treating students as passive knowledge consumers and (2) alternative visions of what is worth knowing and what constitutes teaching and learning.
- (46) This case study showed how one novice teacher began to question institutionalized assumptions in the context of a graduate course and how she began to think more complexly. The case study reinforced for me the importance of creating contexts in which teachers can examine their own backgrounds and beliefs, interact with one another, and interact with ideas that stretch them intellectually. Of course, no two teachers bring the same prior experiences, beliefs, and commitments. The challenge for an instructor lies in planning a course that activates a variety of experiences and enables uncomfortable questions and disagreements to take place so that teachers can grow. This inquiry into learning has helped me make sense of that challenge.

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