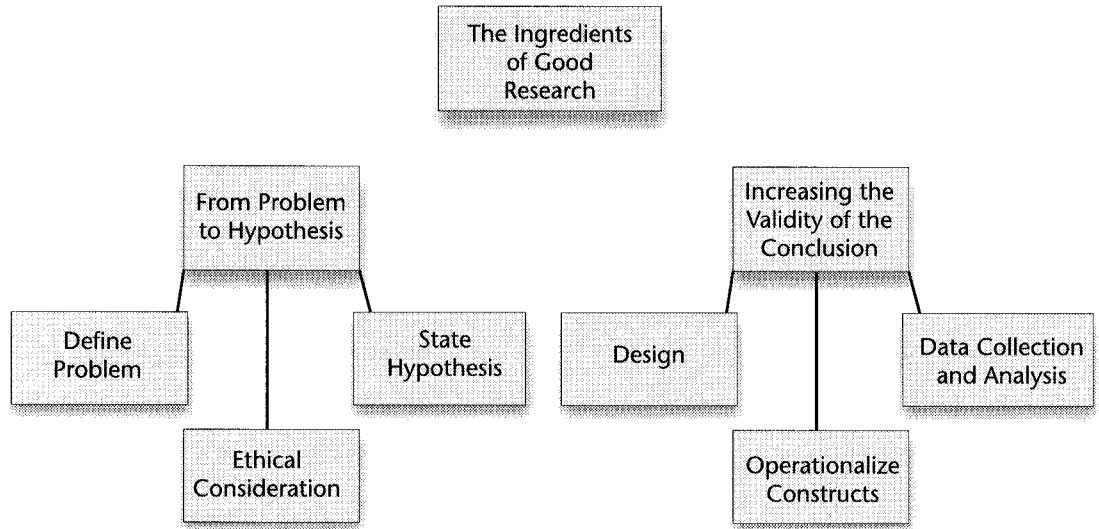


## The Fundamentals Still Apply

**I**'m pretty good at observing the kids as they interact or react to me in the class. I even write things down and try to think about it before I make changes. I just never feel totally confident that what I am seeing is accurate or that the conclusions I draw are valid.

**CONTENT MAP 2**

The teacher cited above is certainly aware of the value of a reflective approach to teaching. As noted in Chapter 1, observing, reflecting, and adjusting are all important elements of being a reflective teacher. In addition to demonstrating the process of reflection in teaching, this teacher articulates an additional concern: How can teachers be confident that what they observe and what they conclude from these observations are correct?

Moving from simply being reflective to becoming more systematic in observations and reflections increases the ability to draw valid conclusions from observations. Using the fundamentals of research as guides to reflective teaching increases the validity of teachers' conclusions and moves the teacher into the role of action researcher.

Whether it's known as participatory or applied, action research is still research. Teachers functioning as action researchers will benefit from the application of research fundamentals in their professional practice.

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### ♦ Chapter Objectives

The current chapter highlights the fundamentals of good research. The chapter discusses how teachers as action researchers can incorporate those fundamentals into their own teaching, ensuring the *research* in "action research," and thereby increasing the accuracy of the observa-

tions made and the conclusions drawn. In addition, the chapter identifies the necessary steps the teachers as practitioner-researchers must take in order to increase the validity of their research and practice.

After reading this chapter, the reader should be able to do the following:

- 1 Redefine an observation into a researchable question and that question into a testable hypothesis.
- 2 Describe methods of data collection and analysis for both qualitative and quantitative research.

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## **THE INGREDIENTS OF GOOD RESEARCH**

In an attempt to improve practice, the teacher as practitioner-researcher must move from simply recognizing and defining a problem or an area of interest to actually planning and implementing a strategy for approaching the problem. Further, as researchers, teachers need to gather data and analyze those findings as a means of assessing the effectiveness of the particular practice under review. Teachers as practitioner-researchers must include the basic ingredients of research methodology in their practice strategies. These basic ingredients are:

1. **Defining the Problem:** What needs to be improved or developed? Action researchers select problems that engage their attention. They have a true desire to find solutions to those problems.
2. **Reviewing the Literature:** What have others found about this situation? The action researcher seeks insights into the problem and possible solutions by reviewing existing research.
3. **Stating the Hypothesis:** What does the action researcher expect to find? The action researcher moves from simply wondering or posing questions to making predictions about what could happen.
4. **Developing and Implementing a Design:** What procedures or conditions will the action researcher use to meet the objectives and increase the validity of the findings?
5. **Collecting and Analyzing Data:** What techniques will the action researcher employ to gather feedback on the impact of the practices? What form of data will the action researcher collect and how will the data be analyzed?

Before discussing these elements in greater detail, an example illustrating how they may appear in a classroom situation will be presented (see Case Illustration 2-1).

Although the previous example is oversimplified, it highlights the potential benefit of framing the practice of teaching with a research

## Case Illustration 2-1

### Adjusting Teaching in Response to Cognitive Style

Mrs. L., a tenth-grade social studies teacher, often employed a process of reviewing material and providing practice oral testing in preparation for a major test. In reflecting on the students' participation in those oral review sessions, she concluded that some students appeared to react quickly and respond to the question almost immediately (observation). Further, she was aware that she would often call on these students. She wondered if those students who were less active were also less sure of the answers, or more confused about the material (testable question). After reviewing the literature on cognitive learning styles (Kagan, 1964) (reviewing the literature), she predicted that the students who were not responding quickly were just as knowledgeable as the quick responders. She thought it was possible that those students simply approached learning from a

more reflective orientation (hypothesis). Mrs. L. identified the students who responded rapidly and those who took more time to respond and compared their average test scores (data collection and analysis). The data indicated that there were no consistent differences in test scores between those two groups of students. She then implemented a change in her process of reviewing for upcoming tests. She began using two different formats—a speed round in which questions and answers were presented in a rapid-fire format and a second format, which she labeled “a time-to-consider round.” In this second form, when questions were asked, students were required to wait one full minute before responding (strategy). She noted during the time-to-consider round that more students (including those who previously did not participate) began to volunteer answers.

mind-set or perspective. Integrating the fundamentals of research with practice can lead to the *enhancement of the teacher's level of effectiveness*.

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## FROM PROBLEM TO HYPOTHESIS

### ◆ Define the Problem

Teachers acting as reflective practitioners seek to investigate issues that help shape decision making and classroom practice. This interest or curiosity may evolve from reading about a theory or from an experience encountered within the classroom. For example, Lisa, a tenth-grade science teacher, just attended a workshop on aggression in the schools, which highlighted the effects of culture and modeling of aggression on student behavior. As a result of the information received, she began to wonder if there were elements within her classroom or even within her school's culture that support or even model aggression for the children. In this case, curiosity and an area of interest was stimulated by the introduction of a new piece of information or theory. Rob, a fifth-grade language arts teacher, noticed that he seemed to make fewer referrals to the counselor's office for aggressive behavior than his partner, Al. Rob knew that Al maintained a very “tight ship” and was quick to punish the children for any violation of class rules, whereas Rob, who used more of a collaborative approach to rule formulation, discussed violations with his

students first, before simply administering consequences. Rob started to wonder if the style and climate of those two classrooms somehow contributed to the level of aggression exhibited by the students.

Although both Lisa and Rob developed an interest in the impact of class climate on aggression, they came to this interest through different avenues. For Lisa it was theory that stimulated her interests; for Rob it was his personal experience. Theory and practice will serve as the two major sources for the action researcher's inquiry.

Once the action researcher has established an area of interest, the next step in defining the problem is to pose a **researchable question** (not just observe the problem). Moving from the "I wonder?" or "what if?" stage to developing a researchable question can be challenging. It is when reflective practitioners ask research-type questions that they begin to become action researchers (Bogdan & Biklen, 1998).

There are a number of ways in which research questions can be categorized. Drew (1980) suggested three general categories of research questions: descriptive, difference, and relationship. The first category, descriptive, includes questions that simply ask what "something is like." For example, the teacher who asks, "What goes on in a class that uses a cooperative goal structure?" is posing a **descriptive question**. A second form of questioning is the **difference question**. Difference questions are comparison questions that look at the differences between two or more phenomena. A teacher may be interested in knowing if students in a class employing cooperative learning strategies have different levels of achievement than those in a teacher-directed classroom. Finally, questions that explore the degree to which two or more constructs are related would be considered **relationship questions**. For example, the teacher in the previous example, having noticed differences in levels of achievement, may question the degree to which there is a relationship between the use of cooperative learning strategies and academic achievement. In order to examine those research questions, the researcher must frame them into a researchable format.

Kerlinger (1986) identified three criteria of "researchable" questions. First, a research question asks a question in a clear, unambiguous form. Secondly, the question asked focuses on a relationship between two or more constructs. Finally, the relationship is one that can be measured in some way.

This last point, stating constructs and relationship in ways they can be measured, is very important. For example, assume that a teacher is interested in knowing the degree to which the use of cooperative learning strategies within the classroom is effective. The first point that needs to be addressed is what is meant by *effective*? Effective at what—or in

**Table 2.1** Moving from Observation to Researchable Question

<b>Observation</b>	<b>Researchable Question</b>
1. I have twenty students in my class.	How effective is a 1:20 ratio of teacher to students in promoting academic achievement?
2. As a result of our school moving toward full inclusion, I have children with physical disabilities within my class.	Would openly discussing the child's disability with the class help to have the child assimilated within the class?
3. Students seem to be having trouble taking complete and accurate class notes.	_____ _____ (To be completed by the reader)

what way? To be researchable, the concept of effectiveness needs to be more clearly and concisely defined. Transforming that initial curiosity into a testable question, the teacher may begin to ask if there is a relationship between the use of a cooperative learning activity and student achievement.

Table 2.1 provides some illustrations of teacher observations, which are reformulated as researchable questions and provide the reader with the opportunity to translate an observation into a researchable question.

### ◆ Reviewing the Literature

For the teacher acting as action researcher, a literature review provides a guide to defining the problem; selecting valid data-gathering devices; creating useful, valid designs; and recommending program interventions. Further, a review of the previous research can assist the teacher in anticipating possible difficulties that may be encountered.

A number of resources are available and can facilitate the search of the literature. Some of the basic sources are:

1. Resources in Education
2. Psychological Abstracts
3. Social Science Citation Index
4. The Education Index

5. Education Resources Information Centers (ERIC)
6. PsychINFO

In addition, many libraries now provide easy access to those and other literature databases via computer connections or CD-ROM.

### ◆ Stating the Hypothesis

What begins as a simple question about the relationships between several variables or constructs may develop into a sense of the expected answer or a prediction about the expected relationships. In this way, research questions take the shape of a research **hypothesis**, which is a more specific and predictive statement. For example, a teacher observing that students seem to have difficulty taking complete, accurate classroom notes may begin to wonder if there is any value in providing the students with a concept map at the beginning of a lecture. After reviewing pertinent literature, the teacher may feel that providing students with a concept map before a lecture will increase their ability to take complete, organized lecture notes. Through this process, the teacher has moved from making a simple observation, through the development of creating a researchable question, and ended with positing a testable hypothesis.

The research hypothesis, therefore, is an affirmative statement that predicts a research outcome or possible explanation of a relationship between two or more variables. Table 2.2 provides examples of how researchable questions may be transformed into testable hypotheses.

**Table 2.2** Moving from Question to Hypothesis

<b>Researchable Question</b>	<b>Testable Hypothesis</b>
How effective is a 1:20 ratio of teacher to student?	Students in classes where there is a 1:20 teacher-to-student ratio will have higher academic achievement than those in a class with a 1:30 teacher-to-student ratio.
Would openly discussing the child's disability with the class help to have the child assimilated within the class?	Having the children ask Alfred questions about his braces and wheelchair will help them to develop a more positive attitude toward Alfred and facilitate his acceptance by his classmates.
Would providing a shy student with some type of classroom job help increase his interaction with other students?	_____
	_____
	_____
	(To be completed by the reader)

## INCREASING THE VALIDITY OF THE CONCLUSIONS

The focus of action research is on the improvement of teaching and teacher decision making. For an action researcher, the goal of research is not just intellectual curiosity or a mere exercise in testing a hypothesis, but rather, the focus and purpose of the action research is to apply findings in a way that enhances practice decisions and positively impacts students and student achievement. In order for action research to be of use, it must produce results and conclusions that are valid and useful.

To conclude that the results observed were in fact due to the explanation provided, the researcher must be relatively certain that there is no other plausible explanation for the observed outcome. The validity of the conclusions increases when alternative explanations can be eliminated. For example, consider the teacher who decided to provide students with concept maps at the beginning of each class lecture and then observed an increase in the degree of accuracy and completeness of the students' notes. This teacher would be less assured of her conclusion that the improved note taking was a result of her implementation of concept maps if at the same time that she introduced concept maps she also shifted to the use of overhead (versus blackboard) notes. In this situation, the introduction of overheads provides a reasonable alternative explanation for the improved student note taking and therefore threatens the degree to which she can feel sure of her conclusions.

When a study has eliminated contaminants, or alternative explanations, it is said to have **internal validity**. Internal validity refers to the degree to which the relationship observed between two or more variables is meaningful in its own right and not due to something else. If there are alternative or rival explanations for the outcomes of the study, these alternatives are referred to as *threats* to the study's internal validity. As long as those threats remain, and other factors can possibly influence the outcome of the study, the researcher cannot be sure of the cause of the observations. Although it is obvious that action researchers should separate and eliminate contaminants from points of investigation, the question becomes "How?" This issue is addressed through the development of systematic, controlled methods of study (a point to be discussed in the remainder of the text).

### ◆ Developing and Implementing a Design

The goal of research is to establish a credible knowledge base. One approach to increasing the credibility of observations is to employ systematic, controlled methods of study. According to Fraenkel and Wallen (1993), a researcher can increase research rigor by



## Action Research

### Meeting the Needs of High-Ability Students

**T**he process of moving from reflective teacher to action researcher is clearly articulated in Lynn Hughes's (1999) article: "Action Research and Practical Inquiry: How can I meet the needs of the high-ability student within my regular education classroom?"

#### Defining the Problem

Ms. Hughes felt that she was not meeting the needs of her high-ability students as a consequence of her school moving from a system of pull-out services for special education students to one in which all educational needs were met within the regular classroom.

#### Reviewing the Literature

The teacher began her research by reviewing the literature on the issue of gifted students in regular education classrooms. Some of the research she reviewed questioned the value of pull-out services for gifted students and other research highlighted the role regular education classrooms could play. Her reading indicated that regardless of the location, it was the quality of instruction that was most important in meeting the needs of the gifted students (p. 283). In addition to reviewing the literature, Ms. Hughes also checked with colleagues from her school and neighboring schools to gain their perspective and suggestions.

#### Developing a Hypothesis

As a result of the information she collected through reading and discussion, Ms. Hughes concluded that high-level learners needed to be challenged consistently. More specifically, she targeted three hypotheses to test (p. 286):

1. In-class enrichment activities will meet the needs of (her) high-ability learners.
2. In-class flexible groups will meet the needs of (her) high-ability learners.
3. Differentiated instruction will meet the needs of (her) high-ability learners.

#### Developing and Implementing a Design

Ms. Hughes decided to incorporate each of the following teaching strategies as part of her classroom regimen: enrichment and acceleration opportunities, flexible grouping, and differentiated instruction. She then assessed the effectiveness of each strategy for her high-ability students using various data-collection techniques.

#### Collecting and Analyzing Data

Ms. Hughes collected data through use of student questionnaires, parent interviews, classroom observations (by colleagues), and teacher-student portfolio conferences. The data collected were reviewed and sorted along general themes.

These data suggested that the following instruction strategies appeared to meet the needs of her high-ability students (p. 288):

1. Provide differentiated instruction and assessment.
2. Engage the students in academic decision making.
3. Use flexible groupings.
4. Plan for the right amount of enrichment versus acceleration for each individual child.

#### Application of Findings

Through the use of an action research approach to teaching, Ms. Hughes learned that she can meet the needs of not only the high-ability students but also the other students in her classroom. Further, her experience with this action research project resulted in the stimulation of many new questions to be answered about how to continue to improve her teaching effectiveness. As she noted: "I find each question answered brings yet another question in my quest to provide my high-ability students with the most effective educational experience" (p. 296). In this way, the reflective-teaching, action research cycle continues.

1. Employing standard procedures and conditions within the study. (See Chapter 5)

2. Collecting extensive information on the relevant characteristics of the subjects in the study. (See Chapter 3)
3. Keeping detailed information on the where, when, and what of the study. (See Chapter 4)
4. Implementing a proper design! (See Chapters 6–9)

### ◆ **Data Collection and Analysis**

The teacher, as action researcher, is interested in improving his or her teaching. To determine if the decisions made have had the desired effect, a teacher gathers and analyzes data. These data provide evidence of the effectiveness of the practice strategy. The information gathered by the teacher as action researcher can take many forms—test scores, frequencies of behaviors, student self-reports, and various documents and artifacts. Traditionally, these data sources have been categorized as either quantitative, which typically concerns number and frequencies, or qualitative procedures, which tend to address more descriptive, personal characteristics of the event (Kincheloe, 1991). A teacher as action researcher may gather data about the students' feelings and attitudes about learning or their creativity (**qualitative data**) in addition to test scores (**quantitative data**). The issues of qualitative and quantitative data will be explored further in upcoming chapters.

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### **COOPERATIVE LEARNING EXERCISE**

#### **From Observation to Hypothesis**

Below you will find a brief listing of areas of “observation” that a classroom teacher might make. Working with your classmates or colleagues:

1. Transform each observation into a researchable question.
2. Find one article or section of a textbook that provides insight into this situation and provides suggestions about what may be done to improve practice.
3. Select a specific action that may positively impact this situation and develop a testable hypothesis. When identifying expected outcomes, be sure to employ concrete, measurable definitions of the outcomes you seek.

Observation	Researchable Question	Testable Hypothesis
This teacher structures her class with lectures, small group exercises, and large group discussions.	_____	_____
The class has two children who require the use of a wheelchair.	_____	_____
This teacher allows her students to move about the class whenever they feel the need to stretch.	_____	_____

### Connections

The chapter closed with a case illustrating a teacher's attempt to systematically investigate the effectiveness of her teaching strategies. How unusual is this practice among teachers? Do other teachers attempt to reflect on their teaching decisions? Do teachers employ systematic observations and data collection in an attempt to assess their own effectiveness within the classroom? Let's find out.

Web site: Go to Classroom Connect at <http://www.connectedteacher.com/home.asp>

Go to Message Board. Post a message on the message board and share the feedback you receive with your colleagues or classmates.

#### SUGGESTED TOPICS

- ◆ What is your experience with employing reflective teaching and action research within your classroom?
- ◆ Do you employ techniques aimed at evaluating the impact of your teaching strategies? If so, would you explain?

### INDIVIDUAL GUIDED PRACTICE EXERCISE

#### Action Research—with Me as Subject

The following exercise is provided to help you personalize the information presented in the chapter. Below is a list of experiences commonly encountered by teachers. Select one area of interest and develop an action research plan incorporating the fundamentals of research discussed in this chapter.

1. Areas of experience
  - a. School projects
  - b. Preparing for a test
  - c. Making a presentation to the class
  - d. Copying notes following a class lecture
2. Developing an action research plan
  - a. Defining the problem
  - b. Reviewing the literature
  - c. Stating the hypothesis
  - d. Developing and implementing a design
  - e. Collecting and analyzing data

### ◆ Key Terms

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descriptive question  
design  
difference question

hypothesis  
internal validity  
qualitative data

quantitative data  
relationship question  
researchable question

### ◆ Suggested Readings

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Brause, R. S., & Mayher, J. S. (1991). *Search and research: What the inquiring teacher needs to know*. London: Falmer Press.

Fraenkel, J. R., & Wallen, N. E. (1993). *How to design and evaluate research in education* (2nd ed.). New York: McGraw-Hill.

Patton, M. Q. (1990). *Qualitative evaluation and research methods*. Newbury Park, CA: Sage.

### ◆ References

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Berliner, C. D. (1987). Ways of thinking about students and classrooms by more and less experienced teachers. In J. Calderhead (Ed.), *Exploring teachers' thinking*. London: Cassell Educational Limited.

———. (1988). *The development of expertise in pedagogy*. Charles W. Hunt Memorial Lecture presented at annual meeting of the American Association of Colleges for Teacher Education (New Orleans).

Bogdan, R. C., & Biklen, S. K. (1998). *Qualitative research in education: An introduction to theory and methods*. Boston: Allyn & Bacon.

Drew, C. F. (1980). *Introduction to designing and conducting research* (2nd ed.). St. Louis, MO: C. V. Mosby.

Fraenkel, J. R., & Wallen, N. E. (1993). *How to design and evaluate research in education* (2nd ed.). New York: McGraw-Hill.

Hughes, L. (1999). Action research and practical inquiry: How can I meet the needs of the high ability student within my regular education classroom? *Journal of Education of the Gifted*, 22(3), 282–297.

Kagan, J. (1964). Impulsive and reflective children. In J. Krumboltz (Ed.), *Learning and the educational process*. Chicago: Rand McNally.

Kerlinger, F. N. (1986). *Foundations of behavioral research* (3rd ed.). New York: Holt, Rinehart & Winston.

Kincheloe, J. L. (1991). *Teachers as researchers: Qualitative inquiry as a path to empowerment*. London: Falmer Press.