Action Research

A Guide for the Teacher Researcher

Sixth Edition

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Pearson

After reading this chapter you should be able to:

7.1 Define data analysis and data interpretation.
7.2 Identify appropriate qualitative data analysis techniques for your action research project.
7.3 Identify appropriate quantitative data analysis and interpretation techniques for your action research project.
7.4 Identify appropriate qualitative data interpretation techniques for your action research project.

After collecting your data, the next steps in the action research process are to review what you have learned and to draw conclusions about what you think your data mean. This chapter provides guidelines and techniques for data analysis (the attempt to fully and accurately summarize and represent the data that have been collected) and data interpretation (the attempt to find meaning in those data, to answer the question "So what?").

Emphasizing Learning by Deemphasizing Grades

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Highland Park High School

Lauren Fagel, Paul Swanson, John Gorleski, and Joe Senese are all members of the Action Research Laboratory (ARL) at Highland Park High School (HPHS) near Chicago, Illinois. This project provides a good example of a team approach to collaborative action research and the kinds of analysis and interpretations that can flow from various data sources.

The scene is a common one for teachers: Papers are returned to students, who immediately search for the grade, sigh, take out calculators, tabulate quarter grades, and then compare grades with their neighbors! The rich comments and

constructive feedback on the papers usually go unheeded—the all-important grade is the prime focus of the students' gazes!

This study was conducted at Highland Park High School, one of two large public high schools in Township District 113. Our student population consists of 1,509 students with an ethnic makeup of 3 percent Asian American, 2 percent African American, 13 percent Hispanic American, and 82 percent white. Ninety-two percent of the student body is college bound, and the parent community strongly encourages high student achievement. Many students enroll in Advanced Placement (AP) classes, strive to become members of the Highland Park Honor Society, and compete to become senior class valedictorian or salutatorian. This ARL group, which included an English teacher, a health teacher, and a history teacher, was concerned about the immense amount of pressure placed on students to receive good grades. We questioned the number system teachers use to assign grades, and we wondered whether grades actually represent what students have learned. We discussed the role of the teacher as assessor, questioning whether we act as true evaluators of student work or simply as "sorters" of students. We lamented the all-encompassing role grades play in the HPHS academic environment. We decided to conduct research in this area, investigating how a deemphasis of grades could, in turn, emphasize learning in the classroom. The research questions were as follows:

1. *How does an elimination of number and letter grades throughout the year (with the exception of quarter and semester grades) affect student attitudes toward learning?*
2. *How does an elimination of number and letter grades throughout the year (with the exception of quarter and semester grades) affect our teaching styles, use of assessments, and choice of curriculum materials?*
3. *How does an extensive use of student self-assessment affect student growth, improvement, and achievement over the course of a school year?*
4. *How does deemphasizing grades allow us to enrich our teaching?*

We began the year by informing students of our involvement in the ARL and presenting a rationale for deemphasizing grades and emphasizing learning. Teachers were still required to assign a grade at the end of each quarter, and students were curious about how their final grade would be determined. We explained how the system would work and followed up by asking students to write down what they thought they would like about the system, what they thought they would not like, and what they did not understand. A letter was also sent home to parents explaining the system and encouraging them to contact us with any questions, concerns, or comments.

Approximately once a month, we met as a team for an entire day of reflection, discussion, brainstorming, and future planning. We quickly found out that certain aspects of our system were working, while others needed refining, and still others needed to be eliminated or replaced.

With the exception of one major project during third quarter, we returned all student work without a number or letter grade. Instead, we used several different

types of markings to indicate to students how well they performed on a particular assessment. On homework assignments, including journal entries, we wrote comments and then assigned a u, u1, or u2. On long-term projects, we either assessed different aspects of the final product on a scale of 1 to 5 and wrote one or two sentences to the student, or we did not use any scale and instead wrote extensive comments. On tests and quizzes we marked objective items wrong when appropriate, assigned a u, u1, or u2 to short-answer and other types of subjective questions, and wrote general comments throughout the test or quiz. Most students were able to tell how well they performed on a particular assessment, and only a very few students persisted by asking us how our comments would translate into a letter grade. In these cases, we found that students were less argumentative than our students had been in the previous year (prior to deemphasizing grades). This year we found ourselves more open to criticism about the way test questions were written and exams were formatted because students seemed to be more genuine in their questioning. They were not arguing for points because there were no points! This created a more community-like setting in the classroom, with all of us aiming for the same goal—learning.

Self-Assessment Worksheet

After some modification during the first semester, we adopted a self-assessment worksheet that encouraged students to reflect on their progress periodically throughout the year. The worksheet included the following headings: Content Mastery, Skill Mastery, Completion of Work, and In-Class Activity. This worksheet evolved into an end of quarter self-evaluation that asked students to select a grade they felt they deserved and then to provide evidence by referring to specific assignments, tests, quizzes, and projects. Finally, by the end of the school year, we were using an end-of-quarter evaluation sheet that listed the student's mid-quarter grade range, the marks they received on specific homework assignments completed since the previous student-teacher-parent conference, and a general comment for each major test, quiz, and project they had completed since mid-quarter. Students' grades were then assigned without holding an end-of-quarter conference.

Another important part of this project was that students accepted responsibility for their grades and participated in developing criteria that would be used to assess the quality of their work. The following criteria are an example of what evolved from involving students in the decision-making process:

"A" Criteria

Participates actively in class
Shows a great deal of effort
Does all homework
Does well on tests
Is on time for class

Shows respect and works well with others
Is always prepared

"B" Criteria

Shows good participation
Misses no more than one to two assignments
Has one to two tardies
Shows good knowledge of material
Has no unauthorized absences
Shows some effort
Demonstrates respect for others

"C" Criteria

Demonstrates some knowledge of material and passes all tests
Work is frequently late or not turned in
Rarely participates in class
Shows little effort
Has several tardies
Has unauthorized absences
Is frequently not prepared

"D" Criteria

Doesn't show knowledge of material and performs poorly on tests
Has large number of assignments not turned in
Shows no effort or participation
Shows little respect for others
Has several unauthorized absences
Is disruptive in class
Is often tardy

By using this rubric, students had guidelines they could use as a reference to accurately assess their performance. The onus on defending a grade now became the students' responsibility and not the teachers't. If students could justify their self-evaluation grade, based on the criteria we had agreed to, that was the grade they received. As a result of this ownership, students had few complaints regarding their grades.

Student-Teacher Conferences

Students appeared to have a difficult time assigning and defending their grades during student-teacher conferences. For many years, students had been conditioned to accept the grades given to them by a teacher without question. They had rarely been asked to participate actively in assigning their own grade. The most valuable part of

these conferences was the opportunity to speak with all students and to get a sense of how they were feeling about the class in general. Often the discussion of grade came at the end of the conference and was the shortest part of the conversation. Students were asked to suggest a grade (before the teacher), but there was a sense that a guessing game was in progress as we tried to balance the teacher's expectations with those of individual students.

The data collected from surveys, observations, and interviews with children suggest that the majority of students were either happy with the grading system or neutral about it. A majority of students indicated that the alternative grading system did affect their academic preparation and performance in class (in a positive way) and that they had a more positive attitude toward the class.

Grades

As we reflected on grade distributions, comparing this year to the previous year, there appeared to be a significant increase in the number of students whose grades fell in the A/A minus range (55 percent this year compared with 27 percent last year). There is no way of knowing exactly what accounted for the increase of As and A minuses; however, we believe that students' involvement in deciding their own grade, as well as the less objective nature of the way grades were assigned (i.e., not entirely based on the percentages scored on tests), had something to do with the outcomes. We believe that the increased focus on personal learning, growth, and improvement that evolved from deemphasizing grades made it less likely for students to fail and more likely for students to accept responsibility for their learning and to provide the evidence that they had learned.

The end-of-year survey revealed that 71 percent of students agreed with the following statement: "I feel that the grading practices used in this course helped me to focus more on my learning than on my grade." Seventy-four percent agreed that "they would recommend that this teacher continue using these grading practices because they help students learn better." We believe that these kinds of statements indicate student support for our deemphasized grading practices and that learning can occur in an environment where the pressure to earn grades is reduced. Students made supporting comments such as these:

"I felt I could concentrate on education."
"It helped me concentrate on improving myself."
"It helps you focus more on information and less on what the teacher wants."
"It relieved a lot of stress and I was able to work at my ability without the competition of grades."
"In comparison to the traditional grading system, this system is the most effective way of assessing my level of performance."
"This method helps me perform best because it's personal to my needs."

It was very reassuring to us to see the pride that students showed and the importance they placed on giving accurate self-evaluation grades. The following two comments illustrate the integrity with which the majority of students approached this responsibility:

"I knew I had to be honest with myself."
"Integrity defines you, and if you die tomorrow, people won't remember your grades or your statistics; they remember how true and real you were with yourself."

We learned a tremendous amount through this research, but as with any research, we were left with more questions than we answered. For example:

- *Is the total elimination of letter and number grades (with the exception of quarter and semester grades) the best way to deemphasize grades?*
- *Is there a way to deemphasize grades that requires less paperwork on the teacher's part? (After all, one of the things we learned through the implementation of this intervention is that grades are expedient and convenient for a harried teacher!)*
- *What is an appropriate role for students to play in determining their own grades?*
- *How can we deemphasize grades and still maintain very specific criteria/outcomes for students?*

By far the most rewarding part of working on an action research team was the opportunity to learn and grow with a small group of teacher colleagues. This experience of mutual commitment provided a wonderful staff development experience; by working with these colleagues consistently throughout the year, we were able to explore new ideas and take risks in the classroom with a type of "safety net" in place. For that reason alone, as well as our desire to explore the new questions and challenges raised by our research, we will continue to conduct action research into the effectiveness of our teaching and grading practices.

Giving up grading practices and beliefs that we have held for years can be a very scary proposition. It is not always easy to turn over some of our control to others. Perhaps our first action research steps need to be "baby steps." This action research project freed us from the grading merry-go-round and provided a new way to address assessment issues. By taking these steps, we were able to devote less time to pencil pushing and calculator crunching and to spend more time with our most important job: helping our students reach their full potential as we strive to reach our full potential as teachers.

Perhaps the most difficult part of action research is the process of trying to make sense of the mountains of data collected over the course of the study. This task is often daunting for action researchers who, while engaged in the regular, ongoing collection of data, must change their focus and adopt a more analytical and interpretive lens. They must move beyond the description of the phenomenon they have studied and make sense of what they have learned.

The Highland Park High School example richly illustrates how a team of teachers worked together to increase their understanding of how deemphasizing grades could help reemphasize student learning. In so doing, the teachers were able to encapsulate the "findings" of their research into "sound bites" that could be shared with other teachers and participants.

Considering how to best proceed with data analysis and data interpretation is critical before, during, and after the action research process and will be impacted by

the type of research you have conducted: qualitative, quantitative, or mixed methods. It is important to think "How am I going to make sense of this data?" before conducting the study to avoid collecting data that are not important or that come in a form that cannot be understood. Similarly, during the study, teacher researchers should reflect on what they are finding and how it can inform their ongoing data collection efforts. Finally, as the systematic collection of data concludes, teacher researchers should determine what they want to "celebrate" and share in their findings.

Ongoing Analysis and Reflection

Action research studies provide teacher researchers with data that can be used formatively and summatively; that is, much of the data collected during the study can be used to positively affect teaching throughout the study. For example, teachers have always reflected on their teaching before, during, and after a particular teaching episode—it's part of our professional disposition. Action research is no different. We can and should take time to analyze our data during the study to decide whether what we are learning is what we had hoped to learn. For example, the Highland Park High School team discovered early in their research that some aspects of their deemphasized grading system were working, whereas others needed to be refined or eliminated. Pausing to analyze and reflect during the action research process is essential.

Anderson, Herr, and Nihlen (1994) maintained that "it is very important to recognize that at various intervals you must stop gathering data and reflect on what you have thus far" (p. 155). For example, these authors suggested that teacher researchers answer two questions to guide their work and reflections:

1. Is your research question still answerable and worth answering?
2. Are your data collection techniques catching the kind of data you wanted and filtering out the data that you don't? (p. 155)

Similarly, Hendricks (2017) discusses the importance of *interim analysis*, a step in the action research process that allows the researcher to make changes to data collection strategies during the research based on the kinds of questions and issues that arise during the ongoing data analysis process. Consciously "pausing" during the investigation will allow you to reflect on what you are attending to and what you are leaving out. Such a reflective stance will continue to guide your efforts (in process) as well as allow for early "hunches" about what you are seeing so far. As Anderson and colleagues (1994) suggested,

> Stopping periodically in the data collection process also allows you to see if you have any gaps in the data, holes where you need data to answer the questions. Seeing this early on in the research allows you to develop the correct techniques for a complete study. (p. 156)

Another way to think of this is in terms of Lewin's (1952) original action research model and the attention given to rethinking, reflecting, discussing, replanning, understanding, and learning during the action research process.

Avoid Premature Action

Although ongoing analysis and reflection is a natural part of the action research process, you should avoid premature actions based on early analysis and interpretation of data. Action researchers—especially those who are inexperienced—often make rash or impulsive decisions based on limited or no data. Neophyte teacher researchers engaged in the first systematic study of their own teaching tend to zealously collect, analyze, and interpret data in a rapid-fire fashion. Their efforts go awry as they become their own best informants and jump to hasty conclusions and impulsive actions.

The action research process takes time. Teacher researchers must be wary of the lure of quick-fix strategies and patient enough to avoid the pitfalls of basing actions on premature analysis. Rarely will a few days of observation provide enough insight to enact a quick-fix strategy! Although it is much easier to start a study with a preconceived notion about what you will find, it's a far greater test of patience, endurance, and integrity to let the action research inquiry slowly unfold over the course of a semester or two.

The Role of Analysis and Interpretation

You will reach a point in the research process where you will want to summarize what you have learned and what you think it means for your students. You will want to share your findings without having to share all of your data and use these

Voices from the Field

Avoid Premature Action

In this vignette, our teacher researcher, Rachelle, provides a good example of a neophyte teacher researcher grappling with the competing agendas of trying to find a "quick fix" while staying true to the research process. Rachelle references the temptation to change her data interpretation and to steer it toward outcomes that she had anticipated prior to the study. It is critical to the success of any action research effort that the teacher researcher avoid premature action based on preliminary and/or incomplete data collection, data analysis, and data interpretation. Similarly, teacher researchers must remain vigilant about the possible impact of their preconceived notions on the rigorous conduct of the action research process.

ENHANCEDetext video example 7–1
Rachelle, the teacher researcher in this video, points out the link between early interpretation and researcher bias.

findings to identify what will happen next in the action research process. This critical component of the action research process is called data analysis and interpretation, and it needs to be carefully thought out.

Data analysis is an attempt by the teacher researcher to summarize collected data in a dependable and accurate manner. The type of data you collect will determine the data analysis techniques you will use. For example, if you collect narrative, descriptive, and nonnumerical data, such as field notes from observations or interviews, questionnaires, or pictures, qualitative data analysis will be best suited for your needs. It is not possible to "number crunch" and reduce this type of data to a manageable form, as is the case in quantitative data analysis. Sometimes, however, quantitative data analysis will be the most appropriate way to summarize your findings, such as when you need to summarize test scores. In this chapter, we will discuss how to analyze both qualitative and quantitative data sources.

After analyzing your data, you will be faced with the task of trying to understand it. **Data interpretation** is an attempt by the researcher to find meaning in the data, to answer the "So what?" question in terms of the implications of the study's findings. Put simply, analysis involves summarizing what's in the data, whereas interpretation involves making sense of—finding meaning in—that data.

Data analysis and interpretation are critical stages in the action research process that require the teacher researcher to both know and understand the data. When analyzing and interpreting data, challenge yourself to explore every possible angle and try to find patterns and seek out new understandings among the data. Remember Deborah South from the Chapter 1 vignette on "how to motivate unmotivated students"? At first, she was convinced that the only feasible interpretation of her data was that her class and her teaching were the causes of the dramatic drop in students' scores. After all, it was the only experience these 18 students had in common during the term! However, as Deborah revisited her data and as her fellow action researchers pushed her to examine other possibilities, it became clear that the homogeneous grouping of "low-achieving" and "unmotivated" students contributed to a "critical mass of negativity" in the classroom. As a result of her commitment to quality data analysis and interpretation, Deborah was able to use her action research findings to make a persuasive argument for the school principal to investigate other "interventions" that might more effectively address the problems of the "unmotivated" student.

Qualitative Data Organization

If data are to be thoroughly analyzed, they must be organized. Ideally, the teacher researcher will have carefully managed notes, records, and artifacts as they were collected; however, as a former classroom teacher, I know sometimes that chaos reigns! So, it is with this sensitivity to the realities of classroom life that I offer some additional organizational tips to "tidy up" your data, ensure their completeness, and make them easier to study. After the data are organized, the analysis can begin in earnest (see Figure 7–1).

figure 7–1 ■ Data Organization Activities

- Write dates (month, day, year) on all notes.
- Sequence all notes with labels (e.g., 6th set of notes).
- Label notes according to type (such as observer's notes, memo to self, transcript from interview).
- Make two photocopies of all notes (field notes, transcripts etc.) and retain original copies.
- Organize computer files into folders according to data type and stages of analysis.
- Make backup copies of all files.
- Read through data and make sure all information is complete and legible before proceeding to analysis and interpretation.
- Begin to note themes and patterns that emerge.

One way to proceed with analysis is to follow three iterative, or repeating, steps: reading/memoing, describing what is going on in the setting, and classifying research data. The process focuses on (1) becoming familiar with the data and identifying potential themes (i.e., reading/memoing); (2) examining the data in depth to provide detailed descriptions of the setting, participants, and activity (i.e., describing); and (3) categorizing and coding pieces of data and grouping them into themes (i.e., classifying).

The interrelations among these steps are not necessarily linear. At the start of data analysis, the logical sequence of activities is from reading/memoing to description to classifying and finally to interpretation. However, as a researcher begins to internalize and reflect on the data, the initial ordered sequence may lose its structure and become more flexible. If you'tve ever driven home pondering some issue or problem and then out of the blue had a sudden flash of understanding that provides a solution, you have a sense of how qualitative data analysis takes place. Once you are *into* the data, it is not the three steps that lead to understanding; it is your ability to think, imagine, create, intuit, and analyze that guides the data analysis. Knowing the steps is not enough; the thinker, imaginer, and hypothesizer—that is, the teacher researcher—is the data analyzer, and the quality of the research analysis depends heavily on the intellectual qualities of the teacher researcher. Let me be very clear about this process: It is a process of digesting the contents of your qualitative data and finding related threads in it. You will not meaningfully accomplish these tasks with one or two or more readings of your data. To make the

kinds of connections needed to analyze and interpret qualitative data, you must know your data—really know it, in your head, not just on paper. The process can be tedious, time consuming, and repetitious; however, the steps can help you understand, describe, and classify qualitative data.

Reading/Memoing

The first step in analysis is to read and write memos about all field notes, transcripts, and observer comments to get an initial sense of the data. To begin, find a quiet place and plan to spend a few hours at a time reading through the data. Krathwohl (1998) wisely pointed out that "the first time you sit down to read your data is the only time you come to that particular set fresh" (p. 309). It is important that you write notes in the margins or underline sections or issues that seem important to you so that you will have a record of your initial thoughts and sense of the data. Later, when you are deeper into the analysis, you may find that many of these early impressions are not useful; however, you may also find that some initial impressions hold up throughout. At this stage of analysis, you should also begin the search for recurring themes or common threads.

Describing

The next step, describing, involves developing thorough and comprehensive descriptions of the participants, the setting, and the phenomenon studied in order to convey the rich complexity of the research. The descriptions are based on your collected observations, interview data, field notes, and artifacts. The aim of this step is to provide a narrative picture of the setting and events that take place in it so you will have an understanding of the context in which the study is taking place. Attention to the research context is a common and important theme in qualitative research because the context influences participants' actions and understandings. Because meaning is influenced by context, analysis (and therefore interpretation) is hampered without a thorough description of the context, actions, and interactions of participants.

An important concern of teacher researchers is portraying the views of the research participants accurately. The descriptions of the research context, meanings, and social relations can be presented in a number of forms. For example, you can describe events in chronological order, create a composite of a typical day in the life of a participant in the setting, focus on key contextual episodes, or illuminate different perspectives of the participants. Regardless of the form, it is crucial that you describe thoroughly how participants define situations and explain their actions. Also, your descriptions should make note of how interactions and social relations among the participants may have changed during the course of the study.

Classifying

Qualitative data analysis is a process of breaking down data into smaller units, determining their import, and putting the pertinent units together in a more

general, analytical form. Qualitative data are typically broken down through the process of classifying or *coding*; the pieces of data are then categorized. A *category* is a classification of ideas or concepts; categorization, then, is grouping the data into themes. When concepts in the data are examined and compared to one another and connections are made, categories are formed.

As an example, consider a teacher researcher who is conducting a qualitative study on characteristics of fifth-grade students' study methods. Suppose the researcher had collected 20 sets of field notes (i.e., based on observations) or 20 transcripts of interviews. The researcher's task is to read through all the notes or transcripts and categorize the meanings or understandings that emerge from the data. The categories provide the basis for structuring the analysis and interpretation—without data that are classified and grouped, a researcher has no reasonable way to analyze qualitative studies. However, the categories identified by one researcher would not necessarily be the same as those identified by another researcher, even if they analyzed the same data. There is no single "correct" way to organize and analyze the data. Different researchers produce different categories from the same data for many reasons, including researcher biases, personal interests, style, and interpretive focus.

Qualitative Data Analysis Techniques

Picture this: After weeks (months, years) of data collection using a variety of qualitative data collection techniques (observations, interviews, surveys, audio recordings, and the like), you sit in your living room (classroom, faculty lounge) with colleagues (or by yourself, perhaps being observed by a curious significant other!) surrounded by files (boxes) of stuff (data in all shapes and forms). This less-than-romantic image of the teacher researcher is a common one. Having immersed themselves in the systematic study of a significant problem, teachers (individually and collectively) are confronted with the somewhat daunting task of data analysis, engaging in analysis that will represent the mountains of descriptive data in a "correct," "accurate," "reliable," and "right" way. There is no easy way to do this work: It is difficult, time consuming, and challenging. Nevertheless, it is potentially the most important step in the action research process as we try to understand what we have learned through our investigations.

The strategies outlined in the following sections will serve as guideposts and prompts to move you through your analysis as efficiently as possible. There is no substitute for taking time to fully immerse yourself in your data. Literally bury yourself in what you have. Read and reread, listen and relisten, watch and rewatch. Get to know intimately what you have collected. Struggle with the nuances and caveats, the subtleties, the persuasive, the incomplete. Avoid premature judgment and action and try to remain aware of what will ultimately improve the lives of the children in your care. These are lofty goals, but they are at the heart of what we are trying to achieve with data analysis.

Identifying Themes

One place to start your analysis is to work inductively as you begin to analyze the data: consider the big picture and start to list "themes" that you have seen emerge in your literature review and in the data collection. Are there patterns that emerge, such as events that keep repeating themselves, key phrases that participants use to describe their feelings, or survey responses that seem to "match" one another? Consider the Highland Park High School action research team in the opening vignette of this chapter. As they gathered their data, they realized that they were dealing with many recurrent themes in their efforts to deemphasize grades—the stress on students created by grades, the satisfaction gained from the renewed focus on learning, the amount of time it took for teachers to assess student work not using traditional grades, and the issues of honesty and integrity, for example.

Coding Surveys, Interviews, and Questionnaires

One of the most frequent data analysis activities undertaken by action researchers is coding, the process of trying to find patterns and meaning in data collected through the use of surveys, interviews, and questionnaires. Working with these types of data is common because surveys, interviews, and questionnaires are generally accepted as part of the school culture, and they provide a great deal of information in a relatively short amount of time.

As you analyze your data, you may need to reduce that data to a manageable form. One way to proceed when working with field notes, transcripts of taped interviews, pictures, maps, charts, and so on is to try to record data on $3'' \times 5''$ index cards so your data will be manageable and allow for sorting. Visual data, such as pictures, maps, charts, and video recordings, may be reduced to a summary statement that captures the themes identified in the data. As you read and reread your data (possibly now reduced to fit on your cards), organize them into categories or themes. Although there is nothing magical about this process, it does take time and a willingness to check that the mountains of descriptive data have been analyzed in a "correct," "accurate," "reliable," and "right" way.

If you can imagine playing a game of cards and not knowing what the symbols on the cards mean, the following analogy might work: You have a deck of cards, each of which contains data. The order of the cards is random. As you initially scan the cards, you have an intuitive sense that the data on some of the cards looks similar to that on other cards. You finish carefully looking at all of the cards and reshuffle the deck. Again you look through the deck, but this time you group together the cards (data) that look alike. You end up with 13 collections of four cards that have some kind of trait in common (the number or face value of the card). Again, you reshuffle the cards. This time as you start to sort through the cards, you notice a different theme (the

suit of the card) and end up with four piles of 13 cards. This is puzzling. Not to be thwarted in your efforts, you again reshuffle the deck and attempt to settle on an organizing theme. You group together cards (data) that have sufficient common characteristics, and you feel confident that your analysis of the data is undeniably accurate. But there is just one problem: What do you do with the Joker that found its way into the pack? And what about that wild card? Where did they come from, and where do they fit? Just when you thought you had it all worked out, in crept something that challenges the themes you have used to organize and represent the data you have collected. The process of shuffling and sorting continues.

A few commonsense guidelines may make this somewhat overwhelming activity of coding mountains of data more manageable:

1. Read through all the data and attach working labels to blocks of text. These labels ought to have meaning for you—a kind of shorthand that will serve as a reference point when you return to the text later in the process.
2. Literally cut and paste the blocks of text onto 3″ × 5″ cards (similar to the card-playing analogy earlier) so that your data are in a manageable form. Use some kind of numbering system so that you can track the block of text back to the original context in which it appeared. For example, noting date and time (1/26/02, 10:15) will help you to locate the reference in your journal or field notes. Remember: Context is important, and you will want to check that you have correctly labeled the text you are trying to funnel into a category with similar text. Trying to shuffle reams of paper can be a difficult task, so cards are beneficial.
3. Start to group together cards that contain the same or similar labels.
4. Revisit each pile of cards and see whether, in fact, the label still fits or whether similar labels actually warrant their own category. This process is somewhat similar to brainstorming and seeking categories that will encapsulate similar thoughts and ideas.

For example, in my study of school district change (Mills, 1988), I found myself with a large pile of 3″ × 5″ cards that included some of the following notations:

Card 1. Assistant superintendent urges principals not to reinvent the wheel but to share ideas with each other as they attempt to deal with an identified problem. (In this case, the problem was low test scores on the California Achievement Test [CAT].) The assistant superintendent states to the principals, "I don't want any of you to think that you are alone out there."

Card 2. One of the principals at the meeting comments, "Clearly, the CAT does not test what we teach in our schools. The test was designed for California, not Oregon."

Card 3. The next meeting of principals following the release of the CAT scores, and the directive from the superintendent that "all schools will develop action plans to address areas of weakness identified by the test scores" does not include any discussion of action plan development.

Card 4. A principal sums up his feelings about standardized testing as follows: "The district makes us go through a whole lot of garbage for little outcome or benefit to the teachers and the students."

Card 5. Principals' meeting 3 months following the release of test scores and action plan mandate. Action plans were due to the curriculum director 7 weeks ago. Principals are instructed that they can have another 2 weeks to complete the plans.

Card 6. The assistant superintendent announces that he will be meeting with principals on an individual basis to discuss how action plans for school improvement will be implemented. It is 4 weeks before the end of the school year and 16 weeks since the initial directive to develop school improvement action plans.

Card 7. One principal commented on the development of the action plan/school improvement plan, "Do I write plans of improvement just to let the central office know that it has been done so that they are satisfied and can get on with doing whatever it is that they do with all the paperwork? I admit that I have written plans and never followed up on them because I'tm too busy getting on with the real business of school."

By following the four commonsense guidelines presented earlier, the first step of "attaching working labels" to blocks of text that are then "cut and pasted" onto cards resulted in the following grouping of cards: Cards 1, 3, and 5 were labeled "Statement of school district approach to school change"; cards 2 and 4 were labeled "Principals' challenges to school district approach"; and cards 6 and 7 were labeled "Inaction of school district approach."

These cards are indicative of the comments that were captured during interviews with individual principals and observations of principals' meetings; collectively, the comments provided the context and understanding for the analysis that resulted in a statement of a theme titled "inaction." In writing about school change as it related to the McKenzie School District, I included in my data analysis a "Taxonomy of Managing and Coping Strategies for Educational Change," which incorporated such themes as "inaction" to describe the change process; that is, one of the ways that the McKenzie School District personnel managed and coped with educational change was to do nothing! Although the story of the change process was fascinating, I have included this example to demonstrate how a theme emerges from the data you collect. I chose the term "inaction" as a theme because it was descriptive (to me) of what was occurring in the district. The same will be true for your own analysis—as

you code your data and reduce them to a manageable form, a label will emerge that describes a pattern of behavior. You will be well on your way to making sense of your data!

Analyzing an Interview

Another common form of qualitative data that action researchers analyze is interview data, most commonly in the form of a transcript from the audio recording of the interview. What follows is an annotated interview between a researcher and a bilingual education teacher as an example of the researcher's analysis of the themes that emerged from the interview.

As this example illustrates, the process of analyzing an interview transcript involves a careful reading of the transcript to identify broad themes emerging from the data that will help answer your research questions. This in-depth, intimate knowledge and examination of the data allows teacher researchers to categorize themes and ideas that will contribute to their understanding of the phenomenon under investigation. In this bilingual education teacher example, fear of change is a pervasive, recurring theme that contributes to the researcher's understanding of the phenomenon and possibly provides an answer to a research question.

Asking Key Questions

Another approach to data analysis involves the use of key questions. According to Stringer (1996), working through a series of questions can enable action researchers to "extend their understanding of the problems and contexts" (p. 87) they have investigated. These key questions may be the very ones with which you began your action research inquiry, the questions mentioned in Chapter 3 that involve the who, what, where, when, why, and how of the educational process. For example, Who is centrally involved? Who has resources? Which ones? What major activities, events, or issues are relevant to the problem? How do acts, activities, and events happen? When does this problem occur? and so on. Although not all these questions will be applicable to any single situation, they may provide a starting point for teacher researchers who are engaged individually or collectively in analysis.

To illustrate, the Highland Park High School team raised questions such as the following: What is an appropriate role for students to play in determining their own grades? How can grades be deemphasized while teachers maintain specific criteria/outcomes for students? Answers to these and other questions will help extend the team's understanding of the problems associated with deemphasizing grades while emphasizing the importance of learning.

Coding from a Sample Interview Transcript

Codes		Themes (and Other Ideas)
	Q: Why do you think that English-only teachers fear bilingual education?	
Culture	A: I think the fear factor is on a real gut-level and personal level. Teachers feel it's kind of a one-way system in that the teachers who are in the all-English program are fearful at a real basic visceral level that their jobs and their livelihood are at risk. Not to mention their culture, their society, and their known world is at risk by this other language coming into the schools and being acknowledged in the schools. And the teacher might say, "Oh well, because I don't have Spanish that means I am going to be out of a job. Am I going to be replaced by a bilingual teacher? If you have this program in my school that means you're going to need bilingual teachers. I am not bilingual so my job is at risk."	Fear Fear of change Job stability Fear of new job
Nativistic movements Patriotic	Q: Do you think that there is resistance towards expecting all children to learn English?	
	A: I think that's an interpretation that comes out of a model like a 90/10. When the child needs to come into the first year and has 90% in Spanish and 10% in English, it's easily perceived that we are withholding English from the child. That is a perception. A 50/50 model is a little more amenable to that because it's obvious that 50% of the time the child isn't getting English.	
	Q: There is the old adage that teachers who oppose bilingual education say, "My ancestors never received bilingual education services in public schools and they did just fine." How do you respond to that kind of attitude toward bilingual education?	
	A: I say that's old thinking. I think that what your parents or your grandparents had to do when they came here from Italy or Norway, or wherever they came from, to learn another language, the language demand was less than it is today. Employment was easier to obtain, let's say a hundred years ago on a manual labor kind of thing. So a person could come here and speak 80% Scottish and 20% English and still be able to get a job because he could manage to do the labor that was required with that little bit of English. It wasn't an academic level of English that he needed, or that my grandfather needed, coming here speaking Norwegian.	
	Q: What about the attitude, "Well they are in the United States, and we speak English here, so they can learn English. That's all there is to it." How would you respond to this attitude?	
	A: That's a big one. That's huge. I think that's a whole cultural, you know, it's based again in fear. Based again in the fact that the	Fear Fear

United States is a very isolated island in that we are closed in by two oceans and we have never had the habit of stretching out beyond our borders much, or valuing much of what is beyond our borders. We are xenophobic in that sense. So we haven't traditionally learned other languages, or been interested in other languages. "Why bother, we're America, the biggest, the toughest, so why would we value anybody else's culture or language?" And I think that's an old thinking as well. It's an old habit.

Q: Do you think that this attitude is changing?

Nativistic movements
Patriotic

A: Well, I'tm not sure. With September 11th and Homeland Security and all that, I think we have had a big reversal. I think we were going to be able to look at a global perspective and we were on the track of maybe reaching out and saying, "Oh, yeah, this is interesting. Wow, this is great. Look at what we are getting from South America. Look at what we are learning from the Greeks. Look at what we are learning from folks traveling in Africa or traveling in Asia. We are gaining so much. We are taking in so much, it's been great." And then September 11th kind of closed that down and kind of put us back in our cave again and made us a little more fearful. I think the other phenomenon is, and I can speak from the point of view of my father, a good old Idaho boy, you know. Like, "If those folks are coming into our culture and they don't learn English. And they don't learn about Thanksgiving and the 4th of July and how we celebrate Valentine's Day and do it the same way we do, then they are going to change our culture. My culture. And if they change my culture then I won't know how to act. And it's my culture in the first place so if they want to be here they need to accept that."

Fear
Fear

Q: I hear in my class all the time, "If I go to Mexico they aren't going to speak English. They are going to expect me to speak Spanish and adhere to their culture." Why are we different? Why should we be more open?

A: Why should we be? Well, there is a big difference between a tourist going to Mexico and somebody coming here for two weeks, or somebody coming here to spend a lifetime and raise their children. That's a really big different set of elements that we are dealing with. So, one of the things about the United States is that we have always said we are a pluralistic culture. You can come here, settle, raise your family, bring your poor, humble, weak, and we will be collectively a nation. So it starts with the

Fear

idea, the salad bowl idea, that we can all be individuals but we are going to make a collective nation. And the contradiction of that is that we want to all be on the same page because we need to be united. I think the fear that we are not united is seen in the commonly held belief that the word "multicultural" is a nasty word. It's an eight-letter word or whatever it is, because it means that we are separating out into our little ghettos, into our little cultures, and we've got Latinos over here and Russians over here, and we've got the Afghanis over here and we've got the Vietnamese here in San Francisco, and they are going to be separated and not be pulling together in one United States. So that goes for elections and social security and achieving resources and services that are federally provided. Schools for example. The thinking would be "Why would we want all those really diverse thinkers? Like maybe we've got a whole bunch of people who are adhering to Islam and they want to come into the public schools and we should educate them? But Islam is apparently against the Anglo-Protestant way of the United States? Why would we let them access our services?" So that is from my father's point of view. Not from mine. But that is from that conservative, older generation in this country.

Doing an Organizational Review

Another approach that Stringer (1996) suggested is undertaking an organizational review that focuses on the following features of the organization (in this case, a school): vision and mission, goals and objectives, structure of the organization, operation, and problems, issues, and concerns (p. 90). Stringer noted, "As participants work through these issues, they will extend their understanding of the organization and aspects of its operation that are relevant to their problems, issues, and concerns" (pp. 90–91). A review of the school, with these features in mind, may provide insight into the data you have collected.

For example, in the Highland Park High School example that opened this chapter, an organizational review of the school's grading policies and communication policies with students and parents would include seeking answers to questions such as the following:

What is the school's mission and vision?
What is the school's policy on grading?
How is the school organized to provide effective communication with students and parents?
What issues arise when a change in grading policy is put into effect?

Answers to these questions would provide the teacher researchers at Highland Park High School with additional insights into the data they collected. However, the questions asked by teacher researchers as part of an organizational review will depend on the organization and the area of focus.

Developing a Concept Map

Stringer (1996) suggested that concept maps are another useful strategy that helps action research participants visualize the major influences that have affected the study. For example, what were the perspectives of the students? Parents? Teachers? Administrators? A concept map gives participants an opportunity to display their analysis of the problem and to determine consistencies and inconsistencies that may exist between the disparate groups. The steps for developing a concept map include the following:

1. List the major influences that have affected the study of your area of focus.
2. Develop a visual representation of the major influences (factors) connecting the influences with relationships you know exist (using solid lines) and influences you have a "hunch" about (using dotted lines).
3. Review the concept map to determine any consistencies or inconsistencies that exist among the influences. This forces you back to your data to see "what's missing."

For example, Jack Reston at Eastview Elementary School (see Chapter 8) concluded that the following factors were major influences on the success of the school's absenteeism policy: respectfulness, safety, conflict management, discipline, school rules, behavior, getting along, self-esteem, and academics. Further, Jack believed that some relationships (real and perceived) existed among these factors (see Figure 7–2).

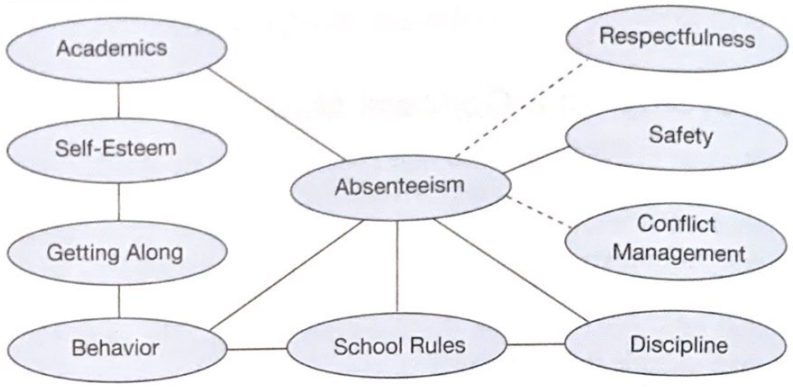
Analyzing Antecedents and Consequences

Stringer (1996) also suggested a process of mapping antecedents (causes) and consequences (effects) to help action researchers identify the major elements of their analysis. Using this framework provides a visual representation of the causal relationships that you, the teacher researcher, now believe exist. It is also helpful to revisit the causal relationships uncovered in your review of the literature to determine challenges and support for your analysis and interpretations.

The steps for analyzing antecedents and consequences are as follows:

1. List the influences that emerged from the analysis for which there appear to be a causal relationship.
2. Revisit the review of literature to determine whether the analysis of the study supports or is challenged by the findings of previous studies.

figure 7–2 ▪ Reston's Concept of the Factors Affecting Absenteeism at Eastview Elementary School



3. Revisit your data to determine whether anything is missing and suggest how your findings may influence the next action research cycle.

As an example, in the Eastview Elementary School study, the concept map (see Figure 7–2) could be expanded to include a mapping of antecedents (causes) and consequences (effects) as an outcome of the analysis. In this example, Jack Reston clearly identified (based on his analysis) that a causal relationship existed between absenteeism and academics (student performance) and absenteeism and discipline (student behavior). Based on these relationships, Reston revisited his review of literature to determine if his data analysis challenged or supported the findings of previous studies. Furthermore, Reston could use these reflections to help formulate the next action research cycle focused on another planned intervention to address absenteeism at Eastview Elementary School.

Displaying Findings

The information you have collected should be summarized in an appropriate and meaningful format that you can share with interested colleagues. To do this, teacher researchers should "think display" as they consider how to convey their findings to interested colleagues. You might use matrices, charts, concept maps, graphs, and figures—whatever works as a practical way to encapsulate the findings of your study. I have also witnessed teacher researchers who have made excellent use of other audiovisual media, such as video recordings and computer multimedia presentations (incorporating text, charts, matrices, audio, and video), to represent their findings. These visual displays of data serve an important function for teachers who wish to share findings and celebrate their insights in a public forum. Putting your data into a visual format might also help you "see" new aspects of your data. (See Appendix B for examples of visual displays of data.)

Stating What's Missing

Finally, as part of your full reporting, flag for the consumers of your research what pieces of the puzzle are still missing and identify any remaining questions for which you have not been able to provide answers. Often we find ourselves wanting and needing to provide answers, to move beyond our data with unwarranted assertions that may, in some cases, ultimately lead to embarrassing questions about what we actually did. In keeping with the theme of avoiding premature judgment (arriving at answers to problems without systematic inquiry), the data analysis technique of stating what's missing allows you to hint at what might or should be done next in your quest to better understand the findings of your study. (See Research in Action Checklist 7–1 for a list of data analysis techniques.)

Using Computer Software to Assist with Data Analysis

Increasingly, computer software is being developed to assist with the analysis of qualitative, narrative data. The important word in this sentence is "assist." This software will not do the analysis for you! Novice researchers need to remember that computers alone do not analyze or even code data. They are designed only to expedite these operations when researchers are working with large bodies of text and other kinds of data. The process of coding, retrieving, and subsequently mulling over and making sense of data remains a laborious process completely controlled by researchers. Even if a computer is used, researchers still must go through the process of punching each code into the data on the computer as they

RESEARCH IN ACTION CHECKLIST 7–1

Data Analysis Strategies

_____ Identify themes.

_____ Code surveys, interviews, and questionnaires.

_____ Analyze an interview.

_____ Ask key questions: who, what, where, when, why, and how?

_____ Do an organizational review of the school.

_____ Develop a concept map.

_____ Analyze antecedents and consequences.

_____ Display findings.

_____ State what is missing.

read through their interviews, field notes, and audio and video recordings. Computers are merely handy and extremely fast labeling and retrieval tools. Researchers also must remember that they alone can tell or program the computer to retrieve and count data in specific ways; the machines do not do these tasks automatically. Although computers can enhance and broaden qualitative research analysis, if you are not connected in some way with a research university, it is unlikely that you will have access to the software and the expertise of someone to teach you how to use the software.

To help you with your decision about whether to proceed with locating and learning a qualitative data analysis software package, let's review some of the factors that might affect the decision:

- Are you analyzing large amounts of data (e.g., more than 500 pages of field notes and transcripts)?
- Are you adequately trained in the use of the programs?
- Do you have the resources to purchase a program, or do you know someone who has the program?
- Do you need to be able to capture specific quotes from a large database? (Questions developed from Creswell, 2015, p. 240.)

Remember, computer software will not do the data analysis for you, but it will help retrieve categories from a large amount of narrative (text) data. Given the

Voices from the Field

Qualitative Data Analysis Techniques

The teacher researcher in this vignette provides some good examples of the kinds of data analysis techniques she used to analyze her field notes, observations, and surveys. Specifically, she identified themes from the field notes and observations by coding categories of student engagement (on task, off task, and enthusiastically on task) and applying a frequency count for each of the categories. She also coded student surveys and used descriptive statistical analysis to better understand how student perceptions changed over the course of her technology intervention.

ENHANCEDetext video example 7–2

The teacher researcher in this video organized and coded her qualitative data for effective analysis. As she describes her procedures, try to identify some of the techniques she used.