5

Data Collection Techniques

After reading this chapter you should be able to:

5.1 Identify and appropriately utilize qualitative data collection techniques.
5.2 Identify and appropriately utilize quantitative data collection techniques.

This chapter introduces qualitative and quantitative data collection techniques that can be used to systematically investigate an area of focus. These techniques include using direct observation, interviews, questionnaires, attitude scales, new and existing records, artifacts, teacher-made tests, standardized tests, and school-generated report cards.

Reflection on Action Research

James Rockford

James Rockford is an elementary teacher in a rural school district in Oregon. James is responsible primarily for teaching music and computer keyboarding skills to young children and initially became involved with action research as part of a statewide action research initiative. As a result of his first attempt at doing action research and his effort to make it a standard part of his teaching, James has also worked as a mentor for other teachers in his region. James's story highlights the importance of collecting data from a variety of sources to fully understand the effects of an intervention on student outcomes.

It seemed to be a perfect match. I had charge of a new computer lab and a mandate to develop a program of instruction to match the curriculum guide, and I needed a "problem" for a collaborative action research class.

The only software that came with the computers was a popular program to teach keyboarding and ClarisWorks. It didn't make any sense to spend several *thousand dollars to teach keyboarding, so the problem became, "How does keyboarding instruction enhance students' ability to use word processing, database, spreadsheet, and draw functions?"*

Looking at the literature proved to be a formidable problem because there wasn't a good academic library in the area. The local community college had one online computer to access ERIC (Educational Resources Information Center) through the World Wide Web if I gave search terms to the librarian. A little help came, but I preferred to do the search myself. Our school was not yet online, so I resorted to using my son's computer. A quick survey of the literature showed plenty of research on keyboarding but not much focused on young children. Opinions ranged from "Start them as early as possible" to "Avoid bad habits" to "Don't bother because they can hunt and peck as fast as they can type."

The problem proved to be a little overwhelming in that I had just started an instructional program to teach all the keyboarding skills, and it became obvious that results would be harder to get for database, spreadsheet, and draw functions. As a result, I decided to look initially only at the effect of teaching keyboarding on word processing for students in grades 4 through 6.

This was supposed to be a collaborative venture, so my first task was to enlist the help of the teachers in grades 4 through 6. We met after school one afternoon so I could explain the purpose of the project. They agreed to help gather data, but only one class actually got into the lab every day. This was disappointing, but it helped make the project more manageable since I would be handling data from only one class instead of three.

What variables might have an effect on students' success in learning to keyboard? I conducted a survey of teacher attitudes and a survey to assess whether students had any prior knowledge, how much time they spent on a computer at home and at school, and whether they had a computer at home. Records were kept for time on computers at school in instructional and free-choice situations.

A well-designed action research project should, as its name declares, lead to some kind of action. The purpose of my action research project was to determine if teaching keyboarding skills to sixth-grade students had enough of an impact on their word processing skills to warrant spending the time and money. It seemed rather obvious that it would, but several students had developed their own unique "hunt-and-peck" system and could already approach the district-mandated target of 20 words per minute. There are many variables that might affect word processing rates, and that led to the following questions:

1. *Do students have a computer at home? How much time do they spend at it per week?*
2. *What preexisting knowledge do students have about computers?*
3. *How much time do students spend at the computer when they're at school? How does it affect word processing rates?*
4. *What is the effect of the keyboarding software used in the lab at school?*

Student Self-Evaluation Survey

1. Do you have a computer that you use outside of school?

   (a) Yes (b) No

2. How many hours a day do you spend at the computer outside of school?

   (a) 0 (b) 1 or less (c) 1–2 (d) 2–3

3. How much time do you spend at the computer while you're at school?

   (a) 0 (b) 15 minutes (c) 30 minutes (d) more than 30 minutes

4. When you type on a keyboard, do you look at the

   (a) monitor (b) keyboard (c) rough draft (d) your neighbor

5. I use the computer to (circle all that apply)

   (a) play games
   (b) write stories and reports
   (c) draw pictures
   (d) collect information and store it
   (e) find information in the library

6. Learning to keyboard in the lab made my life with computers

   (a) easier (b) more frustrating (c) no different

7. If I had the chance to do more with computers, I would

   ____

8. The best thing about learning to keyboard is

   ____

9. The hardest thing about learning to keyboard is

   ____

The questions were then placed in a data matrix and triangulated as follows (Note: D.S. = data source):

Questions	*D.S. 1*	*D.S. 2*	*D.S. 3*
Preexisting knowledge?	Students' survey	Computer knowledge pretest	
Keyboarding speed?	Pretest	Posttest	Teacher help
Appropriate use (WP)?	Pretest software	Posttest software	Timed typing teacher constructed
Time on computers?	School lab records	Student survey	Parent survey

I collected data using surveys that I developed to measure the following areas:

- *Student self-evaluation questionnaire*
- *Teacher-constructed vocabulary/facts pretest of general computer knowledge*
- *Teacher-constructed timed typing test rates*
- *A classroom teacher survey of knowledge/attitudes about technology*
- *A teacher observation record for the computer lab*
- *Existing records of students' word processing rates with software*
- *Parent survey of student computer use outside of school*

Data were compiled as follows:

- *The three variables of time, prior knowledge, and use of keyboarding software were analyzed using a scatter plot graph to determine any correlation to word processing speed.*
- *Surveys were compiled to show tendencies.*
- *Keyboarding rates between October and May were compiled in graph form to show progress over time.*

In general, the data indicated the following:

- *Student time spent on computers out of school had no effect on word processing rate. (They love those computer games!)*
- *Time spent on computers at school was critical.*
- *In only 1 month, the class word processing rate mean had increased 300 percent.*

As a result, it was apparent that the keyboarding software was effective, and on that basis I continued its use. Because time on task is critical, teachers were urged to take students to the lab every day and monitor keyboarding habits as well as install keyboarding software on classroom computers so that each student *received a minimum of 10 minutes' practice per day. Timed typing tests require greater and different skills than are called for on keyboarding software. In the future, timed typing tests will be given weekly to provide an authentic assessment of student progress, and a tracking system will be used to monitor the acquisition of skill development.*

Any research worth its salt appears to generate more questions than it answers. At the completion of this project, I was left wondering if a student's learning style had any impact on the ability to learn word processing skills. Would keyboarding instruction improve students' use of database, spreadsheet, and draw/paint functions? Could other types of authentic assessment be used to determine skill/concept development? These are questions I will continue to investigate.

The project became a springboard to address issues in setting up a computer lab. Instead of being behind the eight ball, I was able to anticipate problems and find solutions. Collaboration was an important part of the process. But perhaps the most powerful part of the action research process was the extent to which I became more reflective about what I was doing in the computer lab. The lab at my school has received a lot of praise from administrators, board members, and teachers, and I believe that going through the action research process has had much to do with the continued success of the lab.

I don't look at classroom problems quite the same way now. For example, I also teach middle school choir and began to notice that the weeks on which I saw eighth graders on Mondays (we're on block scheduling), it was usually a difficult, if not unproductive rehearsal. Keeping some informal data about those days and reflecting about why they were so difficult led me to try some interventions that might help alleviate the problem. It may be a bit corny, but action research has changed my life—in the classroom anyway. Student learning is enhanced, I approach problems more systematically, I gather data more carefully and accurately, and my practice is more reflective.

The year following my word processing action research project, I had the good fortune to be a mentor for other teachers learning the action research process. Based on this experience, two observations come to mind. Problem formulation is a difficult process. Extra time spent in this phase of the action research cycle will prevent backtracking, headaches, and frustration down the road. When teachers do identify something that needs addressing, there appears to be a measurable difference between problems that are student centered and those that arise from a teacher complaint about a teaching situation. It appeared that the problems that are student centered are more likely to result in the improvement of instruction.

Making action research a natural part of the teaching process, in the classroom and the school, is critical to success. Traditionally, teachers are not researchers. The school routine isn't geared to provide teachers with the time and resources that research demands. Teachers are considered to be working only when they're in front of a class. On the other hand, teachers need to develop the attitude that improvement of the teaching/learning process can and should be addressed with data-based decision making formalized through action research.

Teacher Survey

1. I take my class to the lab

   (a) once a week (b) twice a week (c) 3 times a week
   (d) 4 times a week (e) every day (f) only when Mr. Rockford is there

2. I expect my students to (circle all that apply)

   (a) compose reports/stories (b) revise reports from written copies
   (c) practice keyboarding (d) other:____________________

3. If I rated my comfort level with computers it would be

   Use it every chance I get — Don't want to be in the same room as one

   5 4 3 2 1

4. I monitor my students' keyboarding technique

   (a) only during lab sessions (b) any time they're at the computer
   (c) never

5. My students' abilities to use the computer have been enhanced by learning to keyboard

   They're experts! — They're still looking for the on switch!

   5 4 3 2 1

6. I would like my students to be able to

____

The decision about what data are collected for an action research area of focus is determined largely by the nature of the problem. There is no one recipe for how to proceed with data collection efforts. Rather, the individual or group must determine what data will contribute to their understanding and resolution of a given problem. Hence, data collection associated with action research is largely an idiosyncratic approach fueled by the desire to understand one's practice and to collect data that are appropriate and accessible.

This chapter will discuss qualitative (experience-based) data collection techniques and quantitative (number-based) techniques. The former includes data sources such as field notes, journals, questionnaires (surveys), maps, and digital recordings, whereas the latter focuses on the collection of teacher-made tests (criterion-referenced tests), standardized tests (norm-referenced tests), school-generated report cards, attitude scales, and the results of student achievement reported on statewide assessment tests.

One approach is not *better* than the other. Your area of focus and research questions will determine the best data collection techniques for your research. As discussed earlier, this may involve *qualitative* data sources and *quantitative* sources using a **mixed-methods** design. However, the literature on action research supports the assertion that qualitative designs are more appropriately applied to action research efforts compared with the application of an experimental pretest-posttest control group design in which the teacher researcher randomly assigns children to either a control group or an experimental group in order to receive a "treatment." Qualitative research is not the "easy" way out for teacher researchers who fear statistics (a.k.a. sadistics!). As you will see, the rigor of good qualitatively oriented action research equals the rigor of doing good quantitatively oriented action research. If your area of focus necessitates a more quantitative, experimental approach, then you should consult more quantitatively oriented references, such as Mills and Gay (2016, chapters 7 to 11) or Creswell (2015).

Qualitative Data Collection Techniques

The receptivity among educators in general and among action researchers in particular to a qualitative (descriptive) way of examining problems is reflected in the action research literature that emphasizes the following data collection techniques and sources:

- Existing archival sources within a school
- Tools for capturing everyday life
- Tools for questioning
- Conventional sources (surveys, questionnaires, etc.)
- Inventive sources (exhibits, portfolios, etc.)
- Interviews
- Oral history and narrative stories
- Rating scales
- Inventories
- Observation
- Mapping
- Visual recordings

- Photography
- Journals and diaries

(Anderson, Herr, & Nihlen, 1994; Calhoun, 1994; Hendricks, 2017; Sagor, 2000; Stringer, 2004; Wells, 1994)

As you can see from these examples, the kinds of data you collect would include descriptive, narrative, and even nonwritten forms. In many cases, these data occur naturally and are regularly collected by teachers and administrators. In simple terms, we are engaging in an activity that seeks to answer the question, "What is going on here?" It is not a mysterious quest but is quite simply an effort to collect data that increase our understanding of the phenomenon under investigation. The three primary fieldwork strategies we will discuss in this chapter are *experiencing*, *enquiring*, and *examining* (Wolcott, 1992, p. 19). Each of these strategies will be discussed in the context of actual teacher researchers' experiences.

Voices from the Field

Qualitative Data Collection Techniques

The teacher researcher in this video vignette describes a variety of qualitative data collection techniques and strategies that she believed would contribute to her understanding of the impact of classroom computers on students' attitudes toward learning and how they actually use computers in their own learning. Jureen uses multiple qualitative data collection techniques, including; classroom observations (recorded as field notes), student surveys (prior to and after implementing computers in her classroom instruction), attitude surveys (semantic differentials), and surveys of her cooperating teacher and educational assistant focused on their observations of implementing technology in the classroom. The teacher researcher's specific research questions help guide the decision about which multiple qualitative data collection techniques will provide a comprehensive picture about "what is going on" in the classroom during the implementation of a technology innovation. While survey results can be analyzed using descriptive statistics, their use in this study is clearly as a qualitative indicator about changes in students' attitudes toward the use of technology in teaching and learning.

ENHANCEDetext video example 5–1
Watch as Jureen, a teacher researcher, describes her data collection techniques in this video. As you listen, reflect on the difference between qualitative and quantitative techniques. Why does she consider her survey to be a qualitative measure?

Experiencing Through Direct Observation

Teachers who undertake action research have countless opportunities to observe in their own classrooms. They observe as a normal component of their teaching, monitoring and adjusting instruction based on the verbal and nonverbal interactions in their classrooms. Therefore, using direct observation as a data collection strategy is familiar and not overly time consuming. As teachers, we are constantly observing our environment and adjusting our teaching based on what we see. Action research gives us a systematic and rigorous way to view this process of observation as a qualitative data collection technique.

Participant Observation

The action research vignettes shared in Chapters 1 to 3 illustrate how teachers "experience" their teaching through observation. James Rockford observed the "hunt-and-peck" keyboarding strategies of his students as a natural part of his teaching. Cathy Mitchell observed audience reactions to the "Violence Improv" and recorded field notes in her daily journal. Deborah South observed the interpersonal interactions of her "study skills" students and recorded her observations in a journal—observations that quickly confirmed the presence of major problems in the classroom. These experiences are all examples of participant observation.

If the researcher is "a genuine participant in the activity being studied," then the researcher is called a **participant observer** (McMillan, 1996, p. 245). According to Spradley (1980), participant observation is undertaken with at least two purposes in mind:

- To observe the activities, people, and physical aspects of a situation
- To engage in activities that are appropriate to a given situation that provide useful information

Participant observation can be done to varying degrees depending on the situation being observed and the opportunities presented: A participant observer can be an *active participant observer*, a *privileged, active observer*, or a *passive observer* (Pelto & Pelto, 1978; Spradley, 1980; Wolcott, 1982, 1997). Depending on the problem, teachers have many opportunities to be active participants in the observation process as they go about their work. However, the tendency with observing is to try to see it all! A good rule of thumb here is to try to do less but to do it better. That is, as you embark on some degree of participant observation, do not be overwhelmed with the task. It is not humanly possible to take in everything that you experience. Be content with furthering your understanding of your area of focus through *manageable* observations. Avoid trying to do too much, and you will be happier with the outcomes.

Active Participant Observer

Teachers, by virtue of teaching, are active participant observers of their teaching practice. When they are actively engaged in teaching, teachers observe the

Voices from the Field

Participant Observation

In this video vignette, our teacher researcher Jureen talks candidly about the challenges facing action researchers studying their own practices. As Jureen states, "It's hard to collect data and teach at the same time." Teachers are always engaged in naturalistic, ongoing data collection efforts as they "monitor and adjust" their instruction. Teachers are always in the role of participant observer to varying degrees, and Jureen shares some helpful participant observation strategies: working collaboratively with colleagues to record classroom observations, "teaching" and then "observing" students engaged in guided practice or other student-centered work, and using digital recordings that can be viewed at a later time. Experienced action researchers become competent observers of their own practice and use participant observation techniques as the cornerstone of their data collection efforts to better understand what is happening in their classrooms.

ENHANCEDetext video example 5–2
In this video, Jureen offers suggestions to make observation easier for teachers, who are always participants in their own classrooms.

outcomes of their teaching. Each time we teach, we monitor the effects of our teaching and adjust our instruction accordingly. As an active participant observer of our own teaching practices, however, we may be so fully immersed in what we are doing that we don't have time to record our observations in a systematic way during the school day. Such recording is a necessary part of being an active participant observer.

In the action research vignettes from Chapters 1 to 3, we saw teachers who were active participant observers of their own teaching. Deborah South observed the "off-task" behavior of her "unmotivated" students during the study skills lessons. Cathy Mitchell observed the nature of the audience participation while she directed the teen theater. James Rockford observed the "hunt-and-peck" strategies used by keyboarding students while he was teaching keyboarding skills. As researchers of our own teaching practices, active participant observation is likely to be the most common "experiencing" data collection technique that we use.

Privileged, Active Observer

Teachers may also have opportunities to observe in a more privileged, active role. That is, they may wish to observe their children during a time when they are not directly responsible for the teaching of a lesson, for example, during a "specialist's" time in music, library, or physical education. These times provide opportunities for teachers to work as a "teacher's aide" while at the same time allowing them to withdraw, stand back, and watch what is happening during a particular teaching episode, moving in and out of the role of teacher, aide, and observer.

Many teachers comment on how valuable these experiences have been in allowing them time to observe the social interactions of students and the impact of a particular instructional strategy on those interactions. By necessity, these privileged, active observer opportunities require teachers to give up valuable time that is often dedicated to duties other than teaching, such as planning, attending team meetings, reading, visiting other classrooms, and relaxing (the all-important "downtime" during a day, if they are fortunate enough to have such a schedule). Taking time to observe one's class is a valuable use of nonteaching time that honors a teacher's effort to improve practice based, in part, on observational data.

Passive Observer

Teachers also have opportunities to be passive observers in classrooms and schools. When teachers take on the role of passive observer, they no longer assume the responsibilities of the teacher—they should focus only on their data collection. A privileged, active observer could be transformed into a passive observer by making explicit to the students and a teaching colleague that the classroom teacher is present only to "see what's going on around here." Students will quickly learn that there are times when their teacher is not going to interact with them as the teacher normally does. The teacher might simply announce, "Today I am going to watch and learn from what you are doing!" Taking a step back from the daily rigor of being "onstage" and performing can be refreshing and provide an insightful opportunity for teachers who are unaccustomed to watching their students in a different setting, through a different lens.

Field Notes

The written records of participant observers are often referred to as **field notes**. For teachers undertaking participant observation efforts in their classrooms, these field notes may take the form of anecdotal records compiled as part of a more systematic authentic assessment or portfolio effort. So, what do you write down in these field notes? Well, it depends on what you are looking for! I can offer only limited guidance to help quell your concerns about the "how-to" of writing field notes. But first let me start with an example of how *not* to do field notes!

During my graduate studies at the University of Oregon, I took a class on ethnographic research in education, and as part of learning how to do ethnography (qualitative research), I was required to conduct a "beginning ethnography" of something that was "culturally different" for me. As an Australian studying in the United States, I had a number of opportunities to study a culturally different phenomenon while at the same time having fun with the project. I chose to study a sorority. As part of this study, I participated in one of the regular ceremonies that was part of the sorority members' lives—a formal dinner held each Monday night at which members were required to wear formals and male guests were expected to wear a jacket and tie.

During the course of the dinner, I frequently excused myself to visit the restroom, stopping along the way to take out my notebook so I could try to record quotes and reconstruct events as they were happening, as I tried to capture in great detail all that I was observing. Of course, the irony in this strategy was that I was missing a great deal of the dinner by removing myself from the setting in a futile effort to record everything. The ridiculousness of the situation became evident when one of my dinner hosts asked me if I was feeling well or if the meal was to my satisfaction. After all, why did I keep leaving the dinner table?!

The message here for teacher researchers who wish to use field notes as part of their data collection efforts is clear: You can't physically record everything that is happening during an observational episode, nor should you try to. The following options for observing and recording field notes are useful ways to proceed (adapted from Wolcott, 1994).

Observe and Record Everything You Possibly Can

If you knew exactly what you wanted to observe when you went into an observation, you would find this data collection process inefficient. Engaging in an effort to "record everything" will quickly attune you to what is of most interest to you. During these observational periods, you can start with a broad sweep of the classroom and gradually narrow your focus as you gain a clearer sense of what is most pressing. You can also decide on your strategies for recording observations. You might choose verbatim conversations, maps and illustrations, photographs, video or audio recordings, or even writing furiously in the fashion of a principal or university professor undertaking an evaluation. It is a very idiosyncratic activity but follow one rule: Don't run off to the restroom every five minutes—you *will* miss something! Do try to maintain a running record of what is happening in a format that will be most helpful for you.

For example, in my study of a school district attempting multiple change efforts (see Mills, 1988), I attended the 37th Annual McKenzie School District Teacher In-Service Day. Part of my field notes from this observation were as follows:

8:30 A.M.	An announcement is made over the public address system requesting that teachers move into the auditorium and take a seat in preparation for the in-service. As the teachers file into the auditorium, the pop song "The Greatest Love of All" is played.
8:41 A.M.	The assistant superintendent welcomes the teachers to the inservice with the conviction that it is also the "best district with the best teachers." The brief welcome is then followed by the Pledge of Allegiance and the introduction of the new assistant superintendent.

8:45 A.M. The assistant superintendent introduces the superintendent as "the superintendent who cares about kids, cares about teachers, and cares about this district."

The next hour of the in-service is focused on introducing new teachers to the district (there were 60 new appointments) and the presentation of information about how a new focus for the district would be at-risk children.

10:00 A.M. The superintendent returns to the lyrics of "The Greatest Love of All" and suggests that the message from the song may be suitable as the district's charge: "Everyone is searching for a hero. People need someone to look up to. I never found anyone who fulfilled my needs . . ." The superintendent compels the teachers to be the heroes for their students and wishes them a successful school year before closing the in-service.

As you can see from this abbreviated example, there is nothing mystical about field notes. They serve as a record of what an observer attended to during the course of an observation and help guide subsequent observations and interviews. This was the beginning of my yearlong fieldwork in the McKenzie School District, and this initial observation helped me to frame questions that guided my efforts to understand how central office personnel, principals, and teachers manage and cope with multiple innovations.

Observe and Look for Nothing in Particular

Try to see the routine in new ways. If you can, try to look with "new eyes" and approach the scene as if you were an outsider. Wolcott (1994) offers helpful advice for teachers conducting observations in classrooms that are so familiar that everything seems ordinary and routine:

> Aware of being familiar with classroom routines, an experienced observer might initiate a new set of observations with the strategy that in yet another classroom one simply assumes "business as usual. . . ." The observer sets a sort of radar, scanning constantly for whatever it is that those in the setting are doing to keep the system operating smoothly. (p. 162)

Look for "Bumps" or Paradoxes

In this strategy, you consider the environment you are observing as if it were "flat"; nothing in particular stands out to you. It is an opportunity for observers to look for the "bumps" in the setting. In action research projects, these "bumps" might be unexpected student responses to a new curriculum or teaching strategy or an unexpected response to a new classroom management plan, seating arrangement, monitoring strategy, or innovation.

For example, the "bumps" observed by a teacher concerned with gender inequity may become painfully evident when the "locus of control" in a classroom is on one or two boys. That is, by keeping a tally of who commanded most of the teacher's attention by answering and asking questions, it became clear that one or two dominant boys were the focus of the activity during a lesson.

This strategy also suggests that teacher researchers look for contradictions or paradoxes in their classrooms. In a sense, this is not dissimilar to the "looking for bumps" strategy because a paradox will often stand out in an obvious way to the teacher who has taken the time to stand back and look at what is happening in the classroom. (See Key Concepts Box 5–1 for a description of the components of effective observation.)

For example, teacher researchers often comment on the unintended consequences of a particular teaching strategy or a curriculum change that have become evident only when they have had an opportunity to stand back and observe the results of their actions. These consequences often present themselves in the form of a paradox—a contradiction in terms. For example, as one teacher researcher commented after attempting to incorporate manipulatives into her math instruction in a primary classroom, "I thought that the use of manipulatives in teaching mathematics would also lead to increased cooperation in group work. Instead, what I saw were my kids fighting over who got to use what and not wanting to share."

KEY CONCEPTS BOX 5–1

Components of Effective Observation

DEGREES OF PARTICIPATION	
Participant observer	Engage in activities and observe activities, people, and physical aspects
Privileged observer	A teacher's aide during specialists' time
Passive observer	Present only to observe what's going on
FIELD NOTES	
Observe and record everything	Attune to what you actually record through verbatim conversations, maps and illustrations, photos, and video and audio recordings
Observe and look for nothing	Try to see beyond the routine and look with a fresh perspective
Look for paradoxes	What are the unintended consequences of action?

Voices from the Field
Field Notes

The teacher researcher in this video vignette claims that she used observations and field notes as part of her mixed-methods research design with an area of focus on the impact of formative and summative assessments on student achievement and attitude. It appears as though Rachelle "looked for bumps" in student behavior in order to capture verbatim comments in response to announcements about upcoming formative and summative assessments. In order to see how "students were reacting" in the classroom, Rachelle could have conducted more sustained observations and considered the use of digital recordings in order to gather a comprehensive picture of what was going on in the classroom. This would have also been aided by the use of maps to capture who was interacting with whom in response to the announcement that formative and summative assessments would be administered and the specific nature of those interactions.

ENHANCEDetext video example 5–3
Rachelle, the teacher researcher shown in this video, used both qualitative and quantitative data collection methods. As she describes her procedures for taking field notes, think about whether she followed the guidelines given in the text.

Enquiring: When the Researcher Asks

A second major category of data collection techniques can be grouped as data that are collected by the teacher through the asking of questions. Teacher researchers may ask questions of students, parents, and other teachers using **interviewing** and **questionnaire** techniques.

As Agar (1980) suggests, information from interviews can serve as the "methodological core" against which observational data can be used to "feed" ongoing informal interviews. That is, observational data (collected through the "experiencing" techniques described earlier) can suggest questions that can be asked in subsequent interviews with children, parents, teachers—whoever the participants in the study might be. Participants in an interview may omit things. Pairing observation and interviewing provides a valuable way to gather complementary data. For example, Cathy Mitchell's Teen Theater Group (see Chapter 3) developed a group interview technique based on observations of audience reactions to performances. This technique involved three company members meeting with a small group of audience members for about 15 minutes following a performance so that they could gauge the audience response to the scenes about teen violence and harassment. One actor served as the interviewer, one served as the scribe, and one kept a running tally of comments and responses.

Informal Ethnographic Interview

The **informal ethnographic interview** is little more than a casual conversation that allows the teacher, in a conversational style, to inquire into something that has presented itself as an opportunity to learn about their practice. Agar (1980) suggests strategies that allow teacher researchers to have a ready set of questions to ask participants in a study, for example, the "5 Ws and H": *who*, *what*, *where*, *when*, *why*, and *how*. Using these prompts, teachers will never be at a loss for a question to add to their understanding of what is happening in their classrooms. For example, in considering the example of the teacher researching the impact of manipulatives on math performance and through observation recognizing the unanticipated consequence of poor sharing of manipulatives, the teacher might ask questions such as these:

- *Who* should be responsible for rotating the materials through the group?
- *What* was the cause of the problem?
- *Where* did the problem originate?
- *When* did the problem of sharing begin?
- *Why* don't you want to share the manipulatives with each other?
- *How* do you think we can solve this problem?

Following the episode, the teacher might briefly jot down in a plan book a summary of what the students had to say and refer back to it later as a valuable data source. Alternatively, the teacher researcher may keep anecdotal records on each student and simply make an entry on the student's file. An example of a student anecdotal record form is presented in Figure 5–1.

Structured Formal Interviews

Teacher researchers may also want to consider formally interviewing children, parents, or colleagues as part of their data collection efforts. Using a structured interview format allows the teacher to ask all the participants the same series of questions. However, a major challenge in constructing any interview is to phrase questions in such a way that they elicit the information you really want. Although this may seem obvious, teacher researchers often feel compelled by tradition and history to ask a lengthy set of questions of which only a part is really their focus. When planning interviews, consider the following options for ensuring the quality of your structured formal interviews:

figure 5–1 ▪ Student Anecdotal Record Form

Student Anecdotal Record Form

Name: Mary Smith

Grade: K

Date: 10/23 Comments: Writing table observation: Mary appears unhappy during the time she spends at the writing table. Her explanation: "I don't have time to think about my story."

Date: ______ Comments: ______

- **Pilot questions on a similar group of respondents.** That is, if you have developed an interview schedule to use with the students in your classroom, try it out on some similarly aged students (not in your class) to see if it makes sense. Their feedback will quickly confirm—or challenge—the assumptions you have made about appropriate language. Using the feedback from the students, revise the questionnaire before administering it to your class.
- **Use questions that vary from convergent to divergent.** That is, use both "open-ended" and "closed" questions in a structured interview or questionnaire.

For example, a closed (convergent) question allows for a brief response, such as "Yes/No." Alternatively, an open-ended (divergent) question can conclude with an "Other Comments" section or a request for the interviewees to "add anything else" they would like to. In so doing, you will provide students with opportunities to elaborate on questions in ways that you had never anticipated. However, the information gathered through open-ended questions is often more difficult to make sense of. But it does allow the teacher researcher to obtain information that might otherwise be considered "outlying" or "discrepant."

- **Persevere with silence and "wait time" to elicit a response.** Otherwise, it becomes too easy to answer your own question!
- **Consider using a digital recorder to capture the interview responses.** One way to ensure that you capture verbatim responses during an interview is to use a digital recorder. After all, you can't write down everything that is said and still maintain rapport with your interviewee. But be warned—this will add to the amount of time that it takes to "write up" your interview. You will need to listen to the recording and transcribe the responses. Furthermore, I seem to suffer from Murphy's Law when it comes to the use of digital recorders! (That is, if something is going to break or malfunction, it will develop a terminal illness on my shift!) I have also interviewed teachers, principals, and superintendents who are very uncomfortable with being recorded. After all, who else will listen to the recording?! Check the body language of whomever you are interviewing to determine if they are okay with the use of the recorder. You may find that your interviewees eventually loosen up!
- **Locate a private place to interview.** Whether you are conducting one-on-one or focus group interviews, be sure to conduct the interview in a private place where you are not likely to be interrupted and where you have the tools for the interview (audio recorder and notepad). You may choose to use your classroom, another teacher's classroom, a study room in the library—anywhere will work as long as you have privacy and your interviewee feels comfortable in the environment. Alternatively, in an informal interview, you may choose to talk to students outside during a recess and play a game of some sort. Some of your colleagues may be very comfortable being interviewed in a faculty lounge or lunchroom. Take your cues from your interviewees as to where they are most comfortable being interviewed.
- **Carefully choose whom you will interview.** Teacher researchers have considerable flexibility about how they will choose whom they interview. The decision to interview will depend largely on the questions you are trying to answer and whether the interviewee is "information rich" (Patton, 1990, p. 169). This is perhaps a statement of the obvious—it doesn't make a lot of sense to interview folks who don't know anything about your area of focus! But at some point you will make a conscious decision about whom you will interview. Will you interview all the children in your class/school? All the teachers? The answer is probably "No." Therefore, you will choose whom to talk

to based on a number of factors: knowledge and experience of the area of focus, verbal skills, and willingness to be interviewed. For most teacher researchers, the choice will be fairly limited—the students in their classes will be the primary targets for interviews. Depending on the number of students in your classes, you may choose to conduct a combination of focus group and individual interviews in order to develop a comprehensive understanding of your area of focus.

- **Take notes during the interview.** Regardless of whether you use a digital recorder during an interview, be sure to take notes to capture the essence of the conversation. This is also an antidote for Murphy's Law! No matter how quickly you can write, you will not be able to capture everything that transpires during the interview. The notes taken during the interview will serve as a road map for you so that you can fill in the blanks as soon as possible after the actual interview. Your interviewees will also appreciate the rapport that you establish with them and not be distracted by your fervent scratching on a notepad! Note taking is largely an idiosyncratic activity. What works for one person may not work for another. I tend to use a combination of verbatim quotes (taken in longhand), abbreviations, and sketches (uses of arrows to link comments that are repeated, smiley faces to capture the interviewee's body language, etc.) to enable me to reconstruct an interview. Given my increasing number of "senior moments," it also speaks to the importance of taking time *as soon as possible after the interview* to write up the field notes for the interview! (The components of interviewing are listed in Key Concepts Box 5–2.)

KEY CONCEPTS BOX 5–2

Components of Interviewing

Informal Interviews	5 WS And H: *Who*, *What*, *Where*, *When*, *Why*, and *How*?
Structured formal interviews	Pilot the interview.
	Use a variety of question formats.
	Use divergent and convergent questions.
	Allow ample "wait time" to elicit a response.
	Consider using an audio recorder to capture the interview responses.
	Locate a private place to conduct the interview.
	Carefully choose whom you will interview.
	Take notes during the interview.

Focus Groups

Another valuable interview technique is the use of focus groups with several individuals who can contribute to your understanding of your area of focus. One way to think of focus groups is as a group interview where you are trying to "collect shared understanding from several individuals as well as to get views from specific people" (Creswell, 2012, p. 218). Focus groups are a particularly useful technique when the interaction among individuals will lead to a shared understanding of the questions being posed by the teacher researcher. For example, James Rockford may have conducted a focus group with the parents of students in his word processing classes to determine a collective view of computer use in the home.

When conducting focus groups, it is important to ensure that all participants have their say and to nurture a group agreement to take turns; that is, participants should understand that the focus group is a sharing activity and that one or two participants should not dominate it. Using a structured or semistructured interview schedule, the teacher researcher can pose questions to the group and encourage all participants to respond. To use sporting metaphors, use a basketball versus a ping-pong questioning style. That is, ask the question, elicit a response, and pass it off to another participant (basketball) versus ask the question, accept the response, and ask another question. Get as much information out of each question as you possibly can and, in the process, ensure that all group participants have an opportunity to respond.

Ideally, the teacher researcher will use an interview to capture the responses from the focus group and then later transcribe the discussion. This is a time-consuming process—perhaps even more so than individual interviews—so be prepared to allocate time to ferreting out the nuances of the focus group interview and the shared understandings that emerge.

E-Mail Interviews

Another approach to interviewing that can be used effectively by teacher researchers is the use of e-mail interviews. With schools becoming increasingly networked, it is easy to use e-mail to interview colleagues and students. For busy teachers, it may be a far more effective use of time to engage in an ongoing conversation using e-mail. Busy professionals can respond to an e-mail either synchronously (during a "live" conversation) or asynchronously (at some other time when you are not sitting at your computer).

There are some pros and cons associated with the use of e-mail interviews. For example, one advantage of the e-mail interview is that the transcription of the interview has already been done for you by the respondent! That is, you don't have to transcribe a recorded interview with a colleague or student. However, there are ethical issues associated with assuring your respondent that his or her text response will be confidential and anonymous. I am not an expert when it comes to technology, but I do not trust that, once I have sent an e-mail to someone, it is not sitting on a server somewhere that is accessible to other, curious folks! This paranoia is further enhanced by the amount of spam (junk e-mail) I receive that has been forwarded from someone else's computer.

In spite of these technical and ethical challenges associated with the use of e-mail interviews, such interviews may be a useful tool to use at your school. If your colleagues are like mine, it is difficult to find time during a day when we can sit down face-to-face to talk. Using e-mail will allow your colleagues and students to respond on their own time line—perhaps from the comfort of their home or the quiet of their classroom or library after school.

Questionnaires

Perhaps the major difference between a structured interview schedule and a questionnaire is that the student or parent will write out the responses on the form provided. Clearly, there are positives and negatives with each approach: Questionnaires allow the teacher researcher to collect large amounts of data in a relatively short amount of time (compared with interviewing the same number of students or parents), whereas interviews allow an opportunity for the teacher to intimately know how each student (and parent) feels about a particular issue but in a time-consuming fashion that few teacher researchers feel is justified. A compromise is to use a questionnaire (when appropriate) and to conduct follow-up interviews with students who have provided written feedback that warrants further investigation. For example, in a conversational way, teachers, as part of their regular teaching, may ask, "Mary, in the questionnaire you returned you commented that. . . . Can you tell me a little more about that?" Similarly, as part of a parent-teacher conference, the teacher may follow up with parents who have returned questionnaires.

Clearly, one major assumption associated with the use of a questionnaire is that the student can read and write. Many teacher researchers exclude the use of a questionnaire on this basis alone but also compromise the time it takes to interview all their students by interviewing only a "representative sample" in their class.

A solid data collection instrument will help to ensure useful responses. Consider the following guidelines for developing and presenting questionnaires:

1. **Carefully proofread questionnaires** (or, better still, have a "critical" friend read your questionnaire) before sending them out. Nothing will turn parents off more quickly than receiving a message from their child's teacher that is filled with errors. Alternatively, students may be thrilled by the chance to point out that there is an error in their teacher's written work.
2. **Avoid a sloppy presentation.** Make the survey attractive and consider using BIG print if necessary.
3. **Avoid a lengthy questionnaire.** Piloting the instrument will give you a realistic sense of how long it will take for your students (or parents) to complete the task. Remember, no matter how much they want to help you, if the questionnaire is too long, it will find its way into the "circular file" instead of back into your hands.

4. **Do not ask unnecessary questions.** This is akin to teachers developing tests that don't match what was taught—a common complaint directed toward the administration of standardized tests. Often, we feel compelled to ask a great deal of trivial information on a questionnaire that is tangential to our stated purpose.
5. **Use structured items with a variety of possible responses.** (See the discussion of Likert scales in this chapter.) Indicate what you mean by "often" and "frequently" and how they differ from each other. Otherwise, your respondents will interpret the meaning of the terms in quite different ways.
6. **Whenever possible, allow for an "Other Comments" section.** This provides respondents with an opportunity to respond openly to your questions. These comments also provide you with an excellent source of "discrepant" data ("I hadn't expected someone to say that!") and an opportunity to follow up with an informal interview to elicit more information from the respondent as your time, energy, and inquisitiveness allow. For example, "In your response to question 3 you stated that. . . . Can you tell me a little more about what you meant?"
7. **Decide whether you want respondents to put their names on the questionnaires or whether you will use a number to keep track of who has responded.** You should assure respondents (students, parents, colleagues) that their confidentiality will be protected throughout the process. However, you can protect respondents while also keeping track of who has responded and deciding whether they have made comments that you feel warrant a follow-up conversation. The key issue here is to assure the students, parents, and colleagues that they will not suffer any negative consequences for anything they might share with you. If we want respondents to be honest and forthright in their answers, we must assure them that they will not be persecuted if they tell us something we don't want to read or hear. (For further discussion of this matter, see the discussion of ethics in Chapter 2.) See Research in Action Checklist 5–1 for guidelines for devising a questionnaire.

Examining: Using and Making Records

This third category for data collection techniques suggests a catchall term to describe everything else that a teacher researcher may collect. Again, many of these data sources are naturally occurring and require only that teachers locate them within their school setting.

Archival Documents

Like classrooms, schools are repositories for all sorts of records—student records, minutes of meetings (faculty, PTA, school board), newspaper clippings about

RESEARCH IN ACTION CHECKLIST 5–1

Guidelines for Devising Questionnaires

_______ Proofread the questionnaire carefully.

_______ Avoid a sloppy presentation.

_______ Avoid a lengthy questionnaire.

_______ Do not ask unnecessary questions.

_______ Use structured items with a variety of possible responses.

_______ Include an "Other Comments" section.

_______ Decide whether to use respondents' names.

_______ Pilot the questionnaire.

_______ Use a variety of question formats.

significant events in the community, and so on. With permission, the teacher researcher can use these sources of data to gain valuable historical insights, identify potential trends, and explain how things got to be the way they are. Clearly, there are many archival data sources that can be accessed by teacher researchers if indicated by their focus areas. Often, clerical assistants, school aides, and student teachers are happy to help with uncovering archival data and organizing them in a way that is most useful to the classroom teacher if they believe that it is contributing to the collective understanding of a pressing educational issue. Don't be bashful about asking for assistance with this task.

Calhoun (1994) lists several archival data sources that exist in schools:

- Attendance rates
- Retention rates
- Discipline referrals
- Dropout rates
- Suspension rates
- Attendance rates at parent-teacher conferences
- Disaggregated data by grade level for student performance on statewide assessments in math, reading, writing, and so on
- Standardized test scores
- Student participation rates in extracurricular activities

Journals

Daily journals kept by both students and teachers are also a valuable data source. As Anderson et al. (1994) point out,

> The journal acts as a narrative technique and records events, thoughts, and feelings that have importance for the writer. As a record kept by a student, it can inform the teacher researcher about changing thoughts and new ideas and the progression of learning. (p. 153)

Students' journals can provide teachers with a valuable window into the students' world (in much the same way that homework assignments provide parents with insights into their children's daily experiences). Teachers can also use daily journals to keep a narrative account of their perspectives of what is happening in their classrooms.

Cochran-Smith and Lytle (1993) have incorporated teachers' journals as a central part of their work with teacher researchers and offer a somewhat expanded definition of what journals might incorporate:

- Journals are records of classroom life in which teachers write observations and reflect on their teaching over time.
- Journals are a collection of descriptions, analyses, and interpretations.
- Journals capture the essence of what is happening with students in classrooms and what this means for future teaching episodes.
- Journals provide teachers with a way to revisit, analyze, and evaluate their experiences over time.
- Journals provide windows on what goes on in school through teachers' eyes (pp. 26–27).

Journals, conceptualized in this way, are more than a single data source—they are an ongoing attempt by teachers to systematically reflect on their practice by constructing a narrative that honors the unique and powerful voice of the teachers' language. Regardless of your specific area of focus, journaling is recommended as a way to keep track of not only observations but also feelings associated with the action research process.

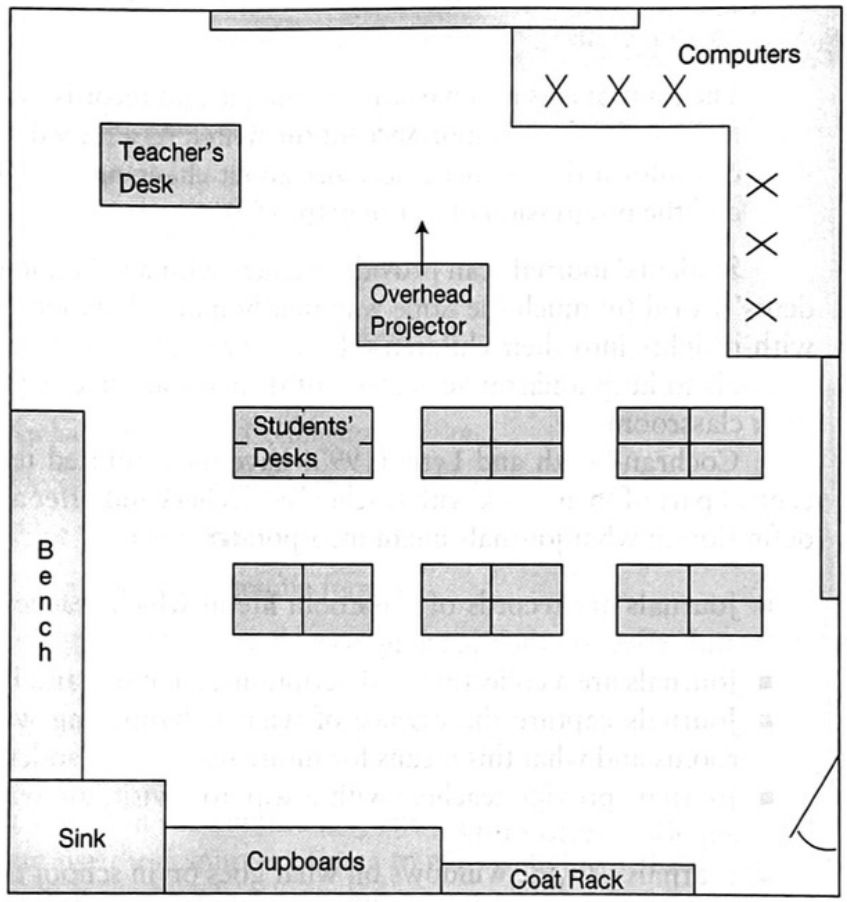
Making Maps, Digital Recordings, and Artifacts

These nonwritten sources of data can also be extremely helpful for teacher researchers trying to monitor movements in a classroom—data that are not always easily recorded in a narrative form.

Construction of Maps

Teacher researchers find class maps and school maps useful for a number of reasons. They provide contextual insights for people who have not visited the school, and they provide the teacher researcher with a reflective tool—a way of rethinking

figure 5–2 ▪ Classroom Map Example



the way things are in their classrooms. For example, why are the computers in the classroom placed in a "bank" along one wall, and what are the effects of individual student computer time on other seat-work activities? A map can also record traffic flow in a classroom as well as teacher movement during instruction.

The school map may also prove useful for teams of teachers who are concerned about the movement and interactions of different grade levels of students and any problems that emerge from the traffic flow. Quite simply, maps are easy, useful tools that help teacher researchers and the people with whom they are sharing their research locate particular teaching episodes in the space of the teacher's classroom or school. For qualitatively oriented classroom researchers, context is everything! Figure 5–2 shows an example of a classroom map.

Digital Recordings

Digital recordings provide teacher researchers with another data source when the teacher is fully engaged in teaching but still wants to capture classroom events and interactions. Of course, there are drawbacks to these techniques. For example, their presence may elicit the usual "funny faces" and bizarre comments that we normally associate with the presence of such technology in a classroom for the first time. One way of moving ahead with these efforts is to introduce them into a classroom early in an action research project and provide the illusion that the "camera is running" when, in fact, there is no film in the camera. Alternatively, be prepared to make a lot of recordings! However, with the move to outcome-based performance assessment and "capstone" experiences, children are often required to demonstrate knowledge and skills through presentations to peers or panels of teachers and parents. A digital recording is an excellent way to capture these events and to provide an opportunity for teachers and students alike to reflect on content, skills, and attitudes demonstrated by the students. Similarly, I have seen teacher researchers effectively use digital photographs (I mean, who doesn't have a camera on their phone?!) to capture events in their classrooms that are central to their given area of focus. For example, James Rockford might have considered the use of photographs to capture the kinds of activities engaged in by students learning word processing.

Assuming there are no technical problems (and that is a pretty big assumption!), using digital recordings also raises the serious issue of time—the time it takes to watch, listen, and record observations from these sources. Although finding enough time is probably the number one challenge for teachers doing action research, it is important for us to weigh the potential benefits and drawbacks of these data sources. These techniques have the potential to be more time consuming and, thus, potentially threatening to the goodwill of any action research endeavor. However, many teacher researchers use these methods to great advantage—which only confirms the idiosyncratic nature of data collection efforts!

DIGITAL RESEARCH TOOLS FOR THE 21ST CENTURY

Speech Recognition Tools

Dragon Mobile Assistant, Dragon Dictation, and Dragon Dictate for Mac 3

Speech recognition programs have been available for many years but were often cumbersome to use and expensive to purchase. However, there are now many smartphone and computer applications available that will save the narrative researcher some of the time spent writing field notes and transcribing interviews. Three such applications are Dragon Mobile Assistant, Dragon Dictation, and Dragon Dictate for Mac 3.

Dragon Mobile Assistant

A new app for your mobile phone, Dragon Mobile Assistant combines the easy-to-use voice recognition software application with a host of other tools for the on-the-go researcher. Need help scheduling an interview? Check your calendar and send an e-mail to your research participants while driving to another research site. This free app can help record your field notes, send e-mails and texts, and make your dinner reservations while automatically detecting the need for hands-free operation.

(*Continued*)

DIGITAL RESEARCH TOOLS FOR THE 21ST CENTURY

Speech Recognition Tools (*Continued*)

Dragon Dictation

Dragon Dictation is an easy-to-use voice recognition software application that allows you to speak and instantly see your content in a text form that can be edited, e-mailed, or even posted to blogs. With a little practice, Dragon Dictation gives the researcher the potential to record observations, field notes, and interviews at five times the speed of typing on a keyboard. This is also a great tool to use to record your thoughts in the car while you are driving to your home or office, and, best of all, it's a free application for smartphone users. As Dragon Dictation claims, "Turn talk into type while you are on the go."

Dragon Dictate for Mac 3

If you're not comfortable with talking and driving and you are looking for a more advanced software package, Dragon Dictate for Mac 3 allows you to convert talk to type at a computer (and to interact with your Mac applications by using only your voice). This program could be used to record interviews with research participants and would therefore save the researcher time spent transcribing. Unlike Dragon Dictation, it is not free, but it may become your favorite computer application and narrative research time-saving tool.

(Mills & Gay, 2016, p. 355)

Artifacts

Classrooms are rich sources of what we might call **artifacts**—written or visual sources of data that contribute to our understanding of what is happening in our classrooms and schools. The category of artifact can include almost everything else that we haven't already discussed. For example, there has been a trend in schools to move toward "authentic assessment" techniques, including the use of student portfolios—a presentation of work that captures individual students' work samples over time and the relative growth of that work. Portfolios, although difficult to quantify, provide the teacher with valuable outcome data that get at the heart of the qualitatively different samples of work. Such artifacts are a valuable data source that teachers may use as a starting point for conversation with their students. For example, a teacher may ask students to explain the differences they see between the work they included in their portfolios earlier and later in the school year. Key Concepts Box 5–3 shows the components of using and making records.

Hence, we have gone full circle in looking at how teacher researchers could use the contents of student portfolios as the basis for an informal interview with their students as they search for greater understanding of the students' perspectives of their learning. For example, a teacher may ask a student to elaborate on the thinking behind a piece of creative writing, artwork, or explanation of an open-ended

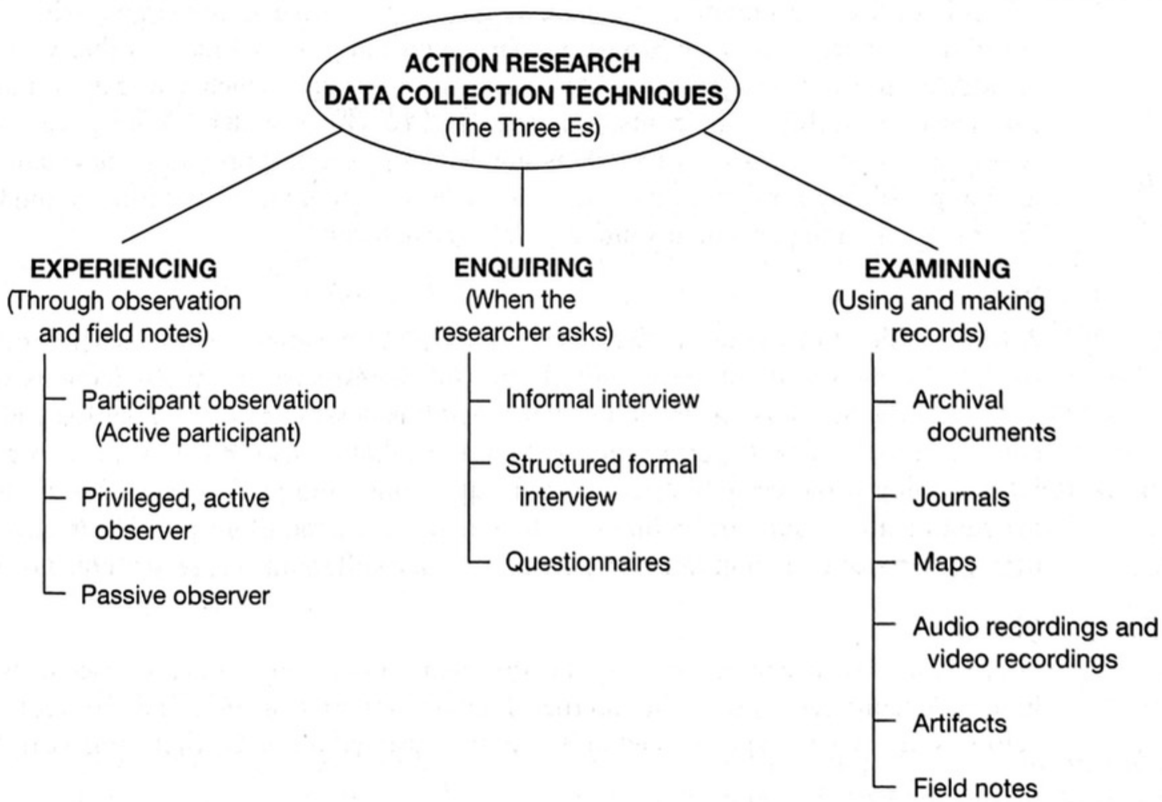
KEY CONCEPTS BOX 5-3

Components of Using and Making Records

Archival sources	Minutes of meetings Attendance rates, retention rates, dropout rates, suspension rates Discipline referrals Statewide assessment scores Newspaper clippings
Journals	Daily observations and analysis Reflections Record keeping
Artifacts	Maps and seating charts Photographs, audio recordings, and video recordings Portfolios or less formal examples of student work

KEY CONCEPTS BOX 5-4

Qualitative Data Collection Techniques



mathematics problem-solving solution. Utilize Agar's "5 Ws and H" to informally engage students in conversation about their work—you'll be pleased with the outcome and the return for your investment of time. Key Concepts Box 5–4 shows the taxonomy of action research qualitative data collection techniques.

The following section illustrates how digital research tools such as wikis, blogs, and Skype can contribute to your qualitative data collection strategies in an ever-changing digital environment. Tools such as these allow action researchers to interact with research participants (colleagues, students, and parents who may be geographically remote) in ways that were not previously thought possible.

DIGITAL RESEARCH TOOLS FOR THE 21ST CENTURY

Wiki, Blog, and Skype

In addition to survey tools (e.g., SurveyMonkey), e-mail, and digital voice and video recordings, there are new Web-based tools that can provide the qualitative researcher with additional data collection strategies.

Wiki

A wiki is a website that allows the easy creation of a Web page that can provide a forum for collaborative research. For example, you could create a wiki focused on an aspect of your research and invite participants (your sample) into a secure setting where they could participate in an open forum. Similarly, you can provide links to other websites, as well as use the wiki as a communication tool through which you can communicate with the study's participants. One popular, free wiki provider is Wikispaces (www.wikispaces.com). Creation of a wiki is simple and secure and provides a new data collection possibility for qualitative researchers who wish to invite Generation X and Generation Y research participants into a collaborative forum.

Blog

A blog (a blend of the term "Web log") is a type of personal website where you can share information about your research and solicit responses from participants while capturing the discourse in chronological order. It is possible to embed photos and videos within your blog as part of the creation of a collaborative research space. A popular, free blog provider is Blogger (www.blogger.com), and getting started is as simple as creating an account and following the template designer. Blogs provide an excellent opportunity for engaging research participants in a collaborative, secure conversation.

Skype

Skype is a proprietary software application that allows users to make voice calls and hold videoconferences over the Internet. Founded in 2003 by Danish and Swedish developers, by 2010 Skype boasted 663 million registered users. By that same year, 13%

of all international call minutes (54 billion minutes) were used by Skype calls. In short, with the proliferation of computers with cameras and cell phones with forward-facing cameras (like the iPhone 6S), Skype provides a new, relatively inexpensive (if not free) qualitative data collection tool for action researchers who are unable to personally visit with research participants

(Mills & Gay, 2016, p. 555).

Quantitative Data Collection Techniques

Many data collection techniques can be used by action researchers that represent common "evaluation" practices in schools and provide the teachers with data that can be reduced to numbers. Action researchers must not confuse the quantitative collection of data with the application of a quantitative research design. Experimental quantitative research requires students to be randomly assigned to a control group or an experimental group and involves manipulation of the independent variables in order to control group assignments. In classrooms, it is usually not feasible for classroom teachers to structure their classroom instruction in this way. However, even if action researchers can't control all of the variables in their classrooms, they can still make use of quantitative data collection techniques to gather useful information about their students that can be analyzed and interpreted using the descriptive statistical techniques.

Teacher-Made Tests

Perhaps one of the most common quantitative data collection techniques used by teachers to aid them in their ability to monitor and adjust instruction is the use of teacher-made tests. That is, teachers will not rely solely on the unit tests provided by textbook companies to determine whether their students have achieved mastery of specific goals and objectives. Often, teachers *adapt* rather than *adopt* commercial curriculum materials and therefore cannot rely on the unit test accompanying the curriculum to be a valid measure of student performance. Similarly, teachers are expert at developing innovative curricula to address a particular area of focus and must make their own tests from scratch. Gathering data from teacher-made tests provides classroom teachers with accessible information about how well their students are responding to a particular teaching or curriculum innovation.

Standardized Tests

Teachers are all too familiar with the kind of standardized tests that swept the nation as a result of the reauthorization of the Elementary and Secondary Education

Voices from the Field

Teacher-Made Tests

The teacher researcher in this video vignette explains the challenges facing an action researcher who is tasked with teaching a required Spanish curriculum and using the associated formative assessments. This scenario is also complicated by the fact that a student teacher/action researcher does not necessarily have the authority to modify the classroom teacher's assessment strategies. However, Rachelle was able to develop a series of formative assessments based on her own lesson planning in the hope that she would be able to collect meaningful data focused on student achievement and attitude throughout the teaching of her Spanish I and Spanish II curriculum. The challenges of using another teacher's teacher-made tests rest with the validity of those tests to accurately measure what Rachelle is teaching in her classes. In this scenario, Rachelle had limited input on the structure and content of these formative assessments, and it is not clear what impact the lack of control had on her findings.

ENHANCEDetext video example 5–4
In this video, Rachelle describes two different types of teacher-made tests—those she made herself and those that other classroom teachers were already using in their classes. What challenges arise in action research when using tests made by the other teachers to collect data?

Act (ESEA) in 2001, touted as the "No Child Left Behind" (NCLB) legislation. These standardized tests were intended to provide teachers, principals, parents, and state and federal education officials with individual student achievement data. These data are often reported as percentile ranks or stanines (see Appendix B) and provide teachers with data about the relative performance of their students. That is, these data provided teachers with a snapshot of how their students were performing on a given subject test relative to all other students taking the test. These data were also aggregated to provide policymakers (e.g., principals and superintendents) with information about whether groups of students and schools were meeting adequate yearly progress (AYP). In the United States, AYP was a critical component of the federal NCLB act. In July 2015, the federal government reauthorized the ESEA after 15 years with the new Every Student Succeeds Act

(ESSA). The ESSA returns responsibility to the states to grapple with issues of teacher quality and student achievement and specifically allows states to use non-academic measures as part of school scores. Regardless of this move, it appears unlikely that schools will be free of standardized test scores as a key measure of student achievement and that teachers will find these quantitative data sources to be a critical component of any action research data collection plan.

Teacher researchers are often pressured or required to use standardized tests. It is not possible to list here all of the standardized tests that exist. We should acknowledge, however, that standardized test scores are another data source that contributes to our understanding of how teaching practices affect our students. A good source for teachers who are investigating standardized tests is the *Mental Measurements Yearbook* (MMY). The MMYs are published by the Buros Institute of Mental Measurements and are a major source of test information for educational researchers. The yearbooks, which can be found in most large libraries, provide information and reviews of published tests in various school subject areas (such as English, mathematics, and reading) as well as personality, intelligence, aptitude, speech and hearing, and vocational tests. The Web addresses for the Buros Institute and its catalogs are at www.unl.edu/buros and www.unl.edu/buros/bimm/html/catalog.html.

School-Generated Report Cards

I was at one time the parent of a high school-aged child (Time and tide stand still for no one! He is now a college graduate.), and I had intimate knowledge of the kind of report cards provided to children and parents to map student progress. My son, Jonathan, was proud to display his report cards on the front of our refrigerator along with all the other important family artifacts commonly found on the family refrigerator (e.g., pictures of family and friends and special vacation places). Along with the teachers' comments (e.g., "Jonathan is an awesome writer," a chip off the old block I would say!), there were the all-important credits earned and the even more important *grade*! At Jonathan's school, grades were reported as letters (A–F) that were ultimately translated into numbers (0–4) in order to calculate a grade-point average (GPA). Students who earned a 3.5 GPA or higher, with a minimum of four credits, qualified for the Honor Roll, and their names appeared in the local newspaper. Hence, school-generated report cards are a valuable data source for teachers (who can quantify student achievement) and for students and parents (who can interpret the data and set goals accordingly).

Attitude Scales

Many teacher researchers are curious about the impact of their work on students' attitudes. Scales that are often used to measure attitudes, such as Likert scales and semantic differentials, are useful tools for the action researcher. The use of attitude scales allows teacher researchers to determine "what an individual believes, perceives, or feels" (Mills & Gay, 2016, p. 164). Nearly all of the action research vignettes in this text include examples of how teacher researchers wanted to know how children "felt" about something (a keyboarding software program, the violence and harassment scenes presented by the Teen Theater group, the absenteeism policy at the school, and the deemphasis of grades). In some cases, these teacher researchers used an attitude scale, whereas others used open-ended questions, such as "How do you feel about the school's absenteeism policy?"

Likert Scales

A **Likert scale** asks students to respond to a series of statements indicating whether they strongly agree (SA), agree (A), are undecided (U), disagree (D), or strongly disagree (SD) with each statement. Each response corresponds with a point value, and a score is determined by adding the point values for each statement. For example, the following point values might be assigned for positive responses: SA = 5, A = 4, U = 3, D = 2, SD = 1. As Mills and Gay (2016) point out, "A high point value on a positively stated item would indicate a positive attitude and a high total score on the test would be indicative of a positive attitude" (p. 164).

Although these instruments provide teacher researchers with quantitative (numerical) data, these data can still be considered descriptive. The responses to such a survey can be reduced to numbers (e.g., the average response was 4.2), but the data are still largely descriptive and analyzed using descriptive statistics, such as mean and standard deviation (see Appendix B) and an accompanying narrative (e.g., "The average response was 4.2 and was supported by the following comments . . .").

To illustrate, students experiencing a new math curriculum that emphasizes problem-solving strategies may be asked to respond to the following item on a questionnaire:

> Please respond to the following items by drawing a circle around the response that most closely reflects your opinion: strongly agree (SA), agree (A), undecided (U), disagree (D), or strongly disagree (SD).

1. I believe that the problem-solving skills I learn in class help me make good problem-solving decisions outside of school.

SA	A	U	D	SD

By assigning the following point values, SA = 5, A = 4, U = 3, D = 2, SD = 1, the teacher researcher would be able to infer whether the students felt positively or negatively about the effect of math problem-solving skills outside the classroom.

Semantic Differential

A **semantic differential** asks a student (or parent) to give a quantitative rating to the subject of the rating scale on a number of bipolar adjectives. For example, following the implementation of a new math curriculum, students might be asked to rate the curriculum in terms of whether it was exciting or boring, relevant or irrelevant, or enjoyable or unenjoyable.

Each location on the continuum between the bipolar words has an associated score:

Boring	___	___	___	___	___	___	___	Exciting
	–3	–2	–1	0	1	2	3	
Irrelevant	___	___	___	___	___	___	___	Relevant
	–3	–2	–1	0	1	2	3	
Unenjoyable	___	___	___	___	___	___	___	Enjoyable
	–3	–2	–1	0	1	2	3	

By totaling scores for all items on the semantic differential, the teacher researcher can determine whether a child's attitude is positive or negative. Semantic differential scales usually have five to seven intervals, with a neutral attitude being assigned a value of zero.

A child who checked the first interval on each of these items would be expressing a positive attitude toward mathematics (for further discussion of semantic differentials, see Mills & Gay, 2016; Pelto & Pelto, 1978). Key Concepts Box 5–5 lists quantitative data collection techniques.

If you are comfortable using the Internet, you can find a veritable smorgasboard of online, Web-based survey tools to the design and analysis of your Likert scale and semantic differential quantitative data collection strategies. See "Digital Research Tools for the 21st Century: Web-Based Survey Tools" to learn more.

KEY CONCEPTS BOX 5–5

Quantitative Data Collection Techniques

- Teacher-made tests
- Standardized tests
- School-generated report cards
- Attitude scales
- Likert scales
- Semantic differential

DIGITAL RESEARCH TOOLS FOR THE 21ST CENTURY

Web-Based Survey Tools

Web-Based Survey Tools

Many Web-based survey tools support the design and analysis of survey research instruments, and many commercial survey research providers have popular online products that cater to educational researchers' needs for the development and analysis of survey instruments. Universities often provide students with free access to survey tool software hosted on the university server. However, do not be lured into a false sense of security by these user-friendly online providers. Remember the guiding principle of "garbage in, garbage out"! The survey researcher must still follow the steps in the research process to ensure that a survey tool based on an existing (commercially available) instrument collects the information necessary to answer the research questions.

What follows is a brief description of four selected online survey sites. However, a simple Google search of "online survey tools" will provide a comprehensive list of free and subscriber services.

SurveyMonkey.com

SurveyMonkey.com provides templates for the development of questionnaires using a variety of response strategies (e.g., multiple choice, rating scales, drop-down menus, etc.) as well as the ability to administer the survey using e-mail invitations, with a record of respondents and nonrespondents, and the ability to analyze results as soon as data arrive. Data are easily downloaded into statistical and spreadsheet programs such as SPSS and Excel but can also be viewed through SurveyMonkey.com in graphic or table form. For detailed information, including pricing and guided tutorials for the development of a survey instrument, visit the home page at www.surveymonkey.com. SurveyMonkey.com also provides links to other online providers so that potential users can conduct a comparison of the services provided.

Zoomerang

Zoomerang provides survey researchers with a free trial to create an online survey, including the ability to pilot test the tool on a small sample and to analyze the results of the trial. Like other commercial online survey providers, Zoomerang provides users with survey templates and the ability to conduct sophisticated statistical analyses of the results. Zoomerang charges users for its regular services but provides a discount for educational institutions. For detailed information, including pricing and a free trial, visit the home page at www.zoomerang.com.

LimeSurvey

LimeSurvey is an open-source, free survey tool that the developers claim "contains everything you need for doing nearly every survey with grace." LimeSurvey has an impressive list of features, including multilingual versions of surveys currently available in 50 languages and access to 20 different question types. The words easy and free are important descriptors for this source, which is available at www.limesurvey.org.

eSurveyspro

eSurveyspro is another open-source, free survey tool that provides 18 different question types and the ability to export your survey data to Excel or SPSS. Like other "free" services, eSurveyspro offers subscriptions for users with advanced survey needs. Visit www.esurveyspro.com for a complete list of survey features.

Qualtrics

Qualtrics is an open-source, free (up to a point), sophisticated survey tool that provides users with over 100 different question types and uses interactive question types and rich media sources in the hope of increasing survey response rates. Qualtrics also provides access to a large library of existing surveys to save time in the development process. Visit www.qualtrics.com for a complete list of survey features and a free account.

(Mills & Gay, 2016, p. 202)

Triangulation

In research terms, the desire to use multiple sources of data is referred to as **triangulation.** It is generally accepted in action research circles that researchers should not rely on any single source of data, interview, observation, or instrument. Sagor (2000) has suggested that action researchers complete a "triangulation matrix—a simple grid that shows the various data sources that will be used to answer each research question" (pp. 19–20). In the vignette that opened this chapter, you can see how Rockford has laid out his triangulation matrix to address issues related to bias in the data collection. (See Figure 5–3 for an example of a triangulation matrix.) We will adopt a less prescriptive approach here, but we support the triangulation principle. That is, the strength of educational research lies in its triangulation, collecting information in many ways rather than relying solely on one (Wolcott, 1988). Pelto and Pelto (1978) have described this as a "multi-instrument" approach (p. 122). For our purposes in doing action research, this suggests that the teacher is the research instrument who, in collecting data, utilizes a variety of techniques over an extended period of time, "ferreting out varying perspectives on complex issues and events" (Wolcott, 1988, p. 192).

It should be noted that this "ferreting out" may involve the combination of qualitative and quantitative approaches by including both qualitative and quantitative data in a single study. For example, a teacher may be shocked to see the steady decline of student performance on statewide reading assessments. In order to better understand the reasons behind the decline, the teacher develops and

figure 5–3 ▪ Triangulation Matrix Example

Research Questions	Data Source		
	1	2	3
1. Preexisting Knowledge?	Student Survey	Computer Knowledge Pretest	
2. Keyboarding Speed?	Pretest	Posttest	Teacher Help
3. Appropriate Use (WP)?	Pretest Software	Posttest Software	Timed Typing Teacher Constructed
4. Time on Computers?	School Lab Records	Student Survey	Parent Survey

administers a survey to students that is focused on out-of-school reading behaviors. Analysis of the survey may reveal that students do not like the choice of reading materials provided by the school and as a result have stopped reading after school. The teacher uses these data as the basis for interviews with some of the students (and, perhaps, parents) in order to better understand the kinds of reading materials that students would find interesting to read out of school. Therefore, our triangulation of data may involve collecting qualitative and quantitative data, allowing us to build on the synergy and strength that exist between qualitative and quantitative research methods. This approach will enable us to understand a phenomenon more fully than is possible using either qualitative or quantitative methods alone. As we begin to focus our data collection efforts, we must keep in mind the principle of triangulation and apply it to our regular data collection efforts.

Realign Your Area of Focus and Action Research Plan When Necessary

By this point in the action research process, teacher researchers have already articulated their area of focus in a problem statement and reviewed the literature based on that idea. However, once they start their data collection, many teacher researchers find themselves drawn into other directions that appear more interesting, relevant, or problematic. That is the very nature of action research; it is intimate, open ended, and often serendipitous. Being clear about a problem is critical in the beginning, but once teacher researchers begin to systematically collect their data, the area of focus will become even clearer.

Be prepared to modify and adjust your action research plan if necessary. For example, a group of teachers started their action research project with an area of focus on the impact of early literacy development on problem-solving skills in mathematics. As their study evolved, it became clear to the participants that their real focus was not on the transfer of literacy to problem solving but rather on the effects of a phonemic skills curriculum on early literacy development. When this focus became clear after some initial data collection, the group decided to change their research questions to more accurately reflect the real nature of their work.

There is nothing wrong with realigning your inquiry midway through it. Remember, action research is done to benefit you and the students in your classroom. The process is a spiral. If you discover a question or a method that seems more fruitful than the one you are currently using, adjust your action research plan and continue on!

Voices from the Field

Realign Your Area of Focus and Action Research Plan When Necessary

In this video vignette, our teacher researcher explains some of the challenges of being able to realign her area of focus and to make changes given the context of being a student teacher working in a cooperating teacher's classroom while also completing an academic program requirement: an action research project. However, the vignette provides a good example of the need for teacher researchers to reflect on their area of focus and data collection strategies and to be prepared to make changes "on the fly." In this scenario, our teacher researcher reflects on her desire to add to her data collection strategies by incorporating student interviews into her plan and in so doing, to better understand students' perceptions and attitudes toward assessment strategies in the classroom.

ENHANCEDetext video example 5–5
Rachelle was required to follow through with her original action research plan to meet a requirement for graduate school. In this video, she notes changes she would make in future studies. One advantage for most teacher researchers is that they can make many of these types of changes right away, realigning the area of focus or the action research plan instead of completing a first study and then planning a new, separate study.

SUMMARY

1. The decision about what data are collected for an action research area of focus is determined largely by the nature of the problem.
2. Qualitative data collection techniques include data sources such as field notes, journals, interviews, maps, and audio and video recordings.
3. Quantitative data collection techniques include data sources such as questionnaires (surveys), attitude scales, teacher-made tests (criterion-referenced tests), standardized tests (norm-referenced tests), school-generated report cards, and the results of student achievement reported on statewide assessment tests.
4. One approach is not better than the other. Your area of focus and research questions will determine the best data collection techniques for your research.
5. A research project might use both qualitative and quantitative sources of data using a mixed-methods design. Mixed-methods research designs combine qualitative and quantitative approaches by including both qualitative and quantitative data in a single study.

Qualitative Data Collection Techniques

6. Qualitative data collection techniques may include the following: existing archival tools within a school, tools for capturing everyday life, tools for questioning, conventional sources (e.g., surveys and questionnaires), inventive sources (e.g., exhibits and portfolios), interviews, oral history and narrative stories, rating scales, inventories, observation, mapping, visual recordings, photography, journals, and diaries.
7. Three qualitative fieldwork strategies include experiencing, enquiring, and examining.
8. In action research, the teacher researcher is the primary data collection instrument.

Experiencing Through Direct Observation

9. When qualitative researchers obtain data by watching the participants, they are observing.
10. A researcher who becomes a part of and a participant in the situation under observation is called a *participant observer*.
11. A researcher can be an active participant observer; a privileged, active observer; or a passive observer.
12. A passive observer watches but does not participate in the situation while observing it.
13. Field notes are the records of what the observer has seen or heard. Field notes contain literal descriptions as well as personal reactions and comments on what the observer has experienced and thought about during an observation session. Field notes may be guided by a protocol developed before the observation session.

Enquiring: When the Researcher Asks

14. The unstructured interview is like a casual conversation and allows the qualitative researcher to inquire into and learn about something that is going on at the research setting.
15. In a structured interview, the researcher has a specified set of questions designed to elicit the same kind of information from all respondents.
16. For interviews, researchers should include convergent and divergent questions and pilot test them with a group of respondents similar to the target sample.
17. Interviewers should take notes during the interview, write notes after the interview, or (preferably) audio or video record the interview and later transcribe it.
18. A focus group is a group interview. Researchers conducting focus groups should ensure that all participants have a chance to state their points of view.
19. An e-mail interview can be used to elicit responses from busy professionals, who can respond to an e-mail either synchronously or asynchronously.
20. A questionnaire is a written collection of self-report questions to be answered by a selected group of research participants.
21. Developing and presenting questionnaires take care; questions should be relevant, and the presentation should be attractive. Be sure to protect participants' confidential information.
22. The Internet offers a veritable smorgasbord of Web-based survey tools to support the design and analysis of survey (questionnaire) research instruments, and many commercial survey research providers have popular online products that cater to action researchers' needs for survey instruments.
23. SurveyMonkey.com provides templates for the development of questionnaires using a variety of response strategies (e.g., multiple choice, rating scales, and drop-down menus) as well as the ability to administer the survey using e-mail invitations, with a record of respondents and nonrespondents and the ability to analyze results as soon as data arrive.
24. Zoomerang provides survey researchers with a free trial to create an online survey, including the ability to pilot test the tool on a small sample and to analyze the results of the trial. Like other commercial online survey providers, Zoomerang provides users with survey templates and the ability to conduct sophisticated statistical analyses of the results.
25. LimeSurvey is an open-source, free survey tool that the developers claim "contains everything you need for doing nearly every survey with grace." The words *easy* and *free* are important descriptors for this source, which is available at www.limesurvey.org.
26. eSurveyspro is another open-source, free survey tool that provides 18 different question types and the ability to export your survey data to Excel or SPSS. Like other "free" services, eSurveyspro offers subscriptions for users with advanced survey needs. Visit www.esurveyspro.com for a complete list of survey features.

27. Qualtrics is an open-source, free (up to a point) sophisticated survey tool that provides users with over 100 different question types and uses interactive question types and rich media sources in the hope of increasing survey response rates. Qualtrics also provides access to a large library of existing surveys to save time in the development process. Visit www.qualtrics.com for a complete list of survey features and a free account.

Examining: Using and Making Records

28. Useful educational records include archival documents, journals, maps, digital recordings, and artifacts.
29. There are many archival data sources that teacher researchers can access: student records, minutes of meetings (faculty, PTA, school board), newspaper clippings about significant events in the community, and so on.
30. Students' journals can provide teachers with a valuable window into the students' world (in much the same way that homework assignments provide parents with insights into their children's daily experiences). Teachers can also use a daily journal to keep a narrative account of their perspectives of what is happening in their classrooms.
31. Maps can also be extremely helpful for teacher researchers trying to monitor movements in a classroom—data that are not always easily recorded in a narrative form.
32. Video and audio recordings provide teacher researchers with another data source when the teacher is fully engaged in teaching but still wants to capture classroom events and interactions.
33. Classrooms are rich sources of what we might call *artifacts*—written or visual sources of data that contribute to our understanding of what is happening in our classrooms and schools.

Quantitative Data Collection Techniques

34. Many data collection techniques can be used by action researchers that represent common "evaluation" practices in schools and provide the teachers with data that can be reduced to numbers. Action researchers must not confuse the quantitative collection of data with the application of a quantitative research design.
35. Quantitative data collection techniques include teacher-made tests, standardized tests, school-generated report cards, attitude scales, Likert scales, and semantic differentials.
36. Teacher-made tests are perhaps one of the most common quantitative data collection techniques used by teachers to aid them in their ability to monitor and adjust instruction. That is, teachers will not rely solely on the unit tests provided by textbook companies to determine whether their students have achieved mastery of specific goals and objectives.

37. Standardized tests are intended to provide teachers, principals, parents, and state and federal education officials with individual student achievement data. These data are often reported as percentile ranks or stanines (see Appendix B) and provide teachers with data about the relative performance of their students.
38. A good source for teachers who are investigating standardized tests is the *Mental Measurements Yearbook* (MMY). The MMYs are published by the Buros Institute of Mental Measurements and are a major source of test information for educational researchers.
39. School-generated report cards are a readily available data source for teachers. Different schools will use different approaches to how student success data are reported but will usually include a letter grade and narrative teacher comment.
40. Attitude scales allow teacher researchers to determine what an individual believes, perceives, or feels; they often use a Likert scale or semantic differential.
41. A Likert scale asks students to respond to a series of statements indicating whether they strongly agree (SA), agree (A), are undecided (U), disagree (D), or strongly disagree (SD) with each statement. Each response corresponds with a point value, and a score is determined by adding the point values for each statement.
42. A semantic differential asks a student (or parent) to give a quantitative rating to the subject of the rating scale on a number of bipolar adjectives.

Triangulation

43. In research terms, the desire to use multiple sources of data is referred to as *triangulation*. It is generally accepted in action research circles that researchers should not rely on any single source of data, interview, observation, or instrument.

Realign Your Area of Focus and Action Research Plan When Necessary

44. Be prepared to modify and adjust your action research plan if necessary.
45. There is nothing wrong with realigning your inquiry midway through it. Remember, action research is done to benefit you and the students in your classroom. The process is a spiral. If you discover a question or a method that seems more fruitful than the one you are currently using, adjust your action research plan and continue on.

TASKS

1. Identify data collection techniques you can use to answer each of your research questions.
2. Identify data collection instruments you need to locate or develop.