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

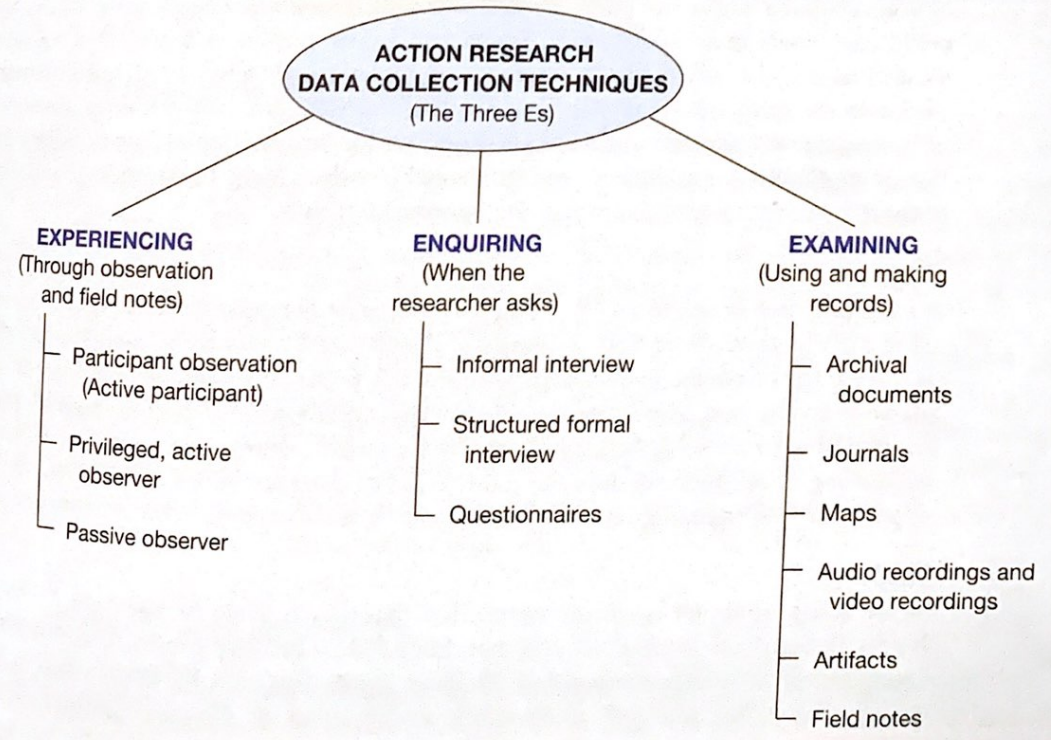
KEY CONCEPTS BOX 5–3

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

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.

lign Your Area of Focus and Action Research n 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.