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Building a Data- Collection Plan

On the surface, no aspect of the action research process appears more daunting than data collection. While the planning you've engaged in thus far has been time consuming, there is nothing new about that. Teachers are accustomed to spending considerable time planning their instruction, units, and programs. While the work you've completed in Stages 1 and 2 of the action research process may be somewhat more extensive than what is required for other more routine types of planning, hopefully the additional clarity and focus that this deliberative planning process produced justified the extra expenditure of energy. However, at first glance, the time required for data collection often doesn't seem that worthwhile to a busy educator.

When anticipating the collection of data for action research, first-time researchers are often legitimately concerned about two things:

1. The time required
2. The need for precision

Because of the importance of these concerns, we will begin our discussion on data collection by addressing each one separately.

DATA COLLECTION AND THE COMPETING DEMANDS FOR YOUR TIME

If devoting time to data collection means using time that could be invested in other learning activities, the cost is greater than most dedicated educators are willing to pay. Fortunately, this is not a choice you have to make. These two categories of professional action appear to be in conflict only if one holds a limited view of what constitutes teaching and what qualifies as data.

WHAT QUALIFIES AS TEACHING?

As every teacher knows, there is more than one way to produce learning. One mechanism educators have historically used to stimulate student learning is direct instruction. This is the model where the teacher is positioned in front of the learner and is responsible for demonstrating or telling the student how to accomplish a task and providing the student with immediate feedback as he or she practices the new skill or recites the new information. There is much to commend this approach, especially when teaching certain types of straightforward basic skill content. And many teachers have found that the direct instruction model works well with learners who need consistent and immediate oversight. However, many teachers have also found that there are an even greater number of circumstances when direct instruction is not the only or even the best pedagogy. Many times, a reliance on direct instruction comes at a heavy cost: It is an all-consuming task, leaving teachers with little time and energy for monitoring, assessing, and adjusting.

Increasingly, teachers are finding out that we serve our students and ourselves best when we act as the *facilitators* of student learning. In this model, the students' role is transformed; they become what Ted Sizer (1984) defined as *knowledge workers*. Every day, the knowledge workers wake up and go to their workplace (your classroom) understanding that they will be expected to fulfill their job descriptions, which is to do that which is necessary to acquire new knowledge and develop greater skill. In this model, the teacher's role becomes analogous to the supervisor's function in the adult workplace. Our job becomes supplying whatever is needed to help the knowledge workers complete their job successfully—in this case, the acquisition of knowledge and the development of skills. In this relationship, the ultimate responsibility for learning becomes shared and no longer rests solely on the teacher's shoulders.

In the adult workplace, supervisors occasionally will demonstrate new techniques, but they spend far more time observing the workers and providing feedback. Supervisors also engage in planning, gathering data on worker productivity, and adjusting individual and group work plans accordingly. They attempt to monitor everything critical to the work being attempted so they can knowledgeably and purposefully intervene

when necessary. Last and most important, when the supervisors' goal is increasing worker productivity, they implement practices and procedures that result in the workers being motivated to put forth their very best efforts.

We need to approach data collection in the spirit of action researchers as learning supervisors. Most of the data-collection strategies presented here can occur during the workday, while your students are purposefully and actively engaged in their own learning. Properly implemented, most of the suggested strategies will also support achievement by providing encouragement, direction, and motivation for your learners.

WHAT QUALIFIES AS DATA?

If you think of data as something artificial, something that only comes into existence if and when we decide to solicit it, then generating and collecting data becomes a job unto itself. This isn't a productive way for an action researcher to view data collection.

As practitioner researchers, you are well served by applying a broad definition of data. Much action research methodology has been heavily influenced by anthropology. The primary work of anthropologists is observing, documenting, and attempting to understand human cultures that are different from their own. The strategy most often used by field anthropologists is direct immersion into the cultures they are studying. While doing their work, they try to take in everything encountered, from one-on-one discussions, to social activities, to local rituals. Even mundane activities, such as eating habits and home decor, are considered data. When all these observations are taken together and analyzed through a sensitive and thoughtful lens, these disparate bits of data can illuminate a complex culture that was the focus of the study.

DATA IN DESCRIPTIVE RESEARCH

When we are conducting descriptive research, our work is nearly identical to that of field anthropologists. Just as they hope to understand what is going on in other cultures by unearthing the meaning of the behavior, habits, and beliefs demonstrated by the members of that culture, the descriptive action researcher is trying to understand the particular circumstances, norms of behavior, and meanings attached to the behavior by the participants in a specific school, classroom, or academic setting. For this reason, when we are engaging in descriptive action research, nearly everything that occurs in the setting we're studying has the potential to be meaningful data for our understanding of the following questions:

- What is going on here?
- Why is it happening?
- What impact is it having?

DATA IN QUASI-EXPERIMENTAL RESEARCH

Action researchers conducting quasi-experimental studies will also be well served to view data collection through the anthropologists' lens. Undoubtedly, quasi-experimental researchers will want to monitor changes in performance on their priority achievement targets and, therefore, will almost always be using some quantitative methods. But that is only part of the process. The quasi-experimental action researcher needs to understand more than simply whether or not the priority targets were hit. It is equally, if not more important to understand the following as well:

- Why was the target hit or missed?
- How did various elements of the theory of action contribute to success or failure?
- What could be learned from this undertaking that might help illuminate other related aspects of the teaching-learning process?

To address these issues, the quasi-experimental researcher has the same need as the descriptive researcher to deeply understand the context and the nuances of the environment where the action took place.

I can hear some of you asking, "Is he crazy? Did he say I ought to be acting as an anthropologist and collecting data on *everything* going on in my school or classroom?"

Not to worry. While it is true that the range of things that you may want to document is vast, the good news is that much of the necessary data is already being and will continue to be collected, whether or not you had ever decided to conduct action research.

One of our primary tasks as action researchers is identifying *efficient* ways to collect and compile the data that already exists in our environment. But before we examine ways to accomplish this, we should spend a few minutes considering the other big concern regarding data collection: achieving adequate precision.

DATA COLLECTION AND CONCERNS ABOUT PRECISION

It is unwise to collect flawed data and even worse to make use of it. None of us wants physicians making treatment decisions based on faulty data, nor do we want to fly in aircraft designed by engineers who relied on imprecise data. Equally important, none of us wants our students to receive inadequate instruction simply because inaccurate data suggested an unwise strategy. Even those of us with the most minimal backgrounds in research and statistics probably recall from Ed Psych 101 the two key conditions that must be met if data is to be considered accurate: validity and reliability.

- *Validity* refers to whether the data actually reflect the phenomena they claim to. For example, we would all agree that a measuring tape is a valid way to measure height and a scale is a valid mechanism for determining weight.
- *Reliability* refers to the accuracy of data. For example, even though a scale is a valid way to measure weight, any particular scale could be broken and consequently provide an unreliable report on the weight of an object.

As professionals, we want the data that we use to influence our decisions on teaching and learning to be both valid and reliable. While there are a number of techniques researchers use to establish validity and reliability, the strategy used most frequently by action researchers is called *triangulation*. As pointed out earlier, triangulation is similar to the strategy used by trial lawyers to prove a case beyond a reasonable doubt. In planning their cases, lawyers strive to find corroboration for every bit of testimony or evidence. Corroboration is accomplished by offering additional independent pieces of evidence that lead to the same conclusion. While any single bit of evidence might be flawed or imprecise enough to raise suspicion, when enough separate and independent pieces of data all point in the same direction, the credibility of the conclusion becomes apparent. Figure 7.1 is a *triangulation matrix* for use with action research. The left column is where we list our research questions. Then, like a trial lawyer preparing a case, we consider all the independent sources of data (witnesses) that might be collected, consulted, and presented so that when taken together, they will provide a credible answer to the research question. Then the separate sources of data are listed in the row corresponding to the research question they will be addressing.

As we proceed through this chapter, it is suggested that you use the triangulation matrix to build a case worthy of your confidence. If you build a triangulated data-collection plan, it is likely that the findings and

Figure 7.1 Triangulation Matrix

<i>Research Question</i>	<i>Data Source 1</i>	<i>Data Source 2</i>	<i>Data Source 3</i>

Source: Reprinted with permission from Richard Sagor, *How to Conduct Collaborative Active Research* (Alexandria, VA: Association for Supervision and Curriculum Development, 1992).

conclusions that emerge from your research will possess both validity and reliability.

FISHING IN A SEA OF DATA

Schools and classrooms are data-rich environments. In any situation where life exists, data is continuously being created. Data represents what people choose to do and what they elect not to do. It involves who is doing an action, what they are doing, and their explanations for why they chose to engage in that action. In places where work is undertaken, such as schools, even more data is produced. Where people work, they produce products; those products are data. Here are just a few of the work products typically created in schools that you could use as sources of action research data:

<i>Work Product</i>	<i>Data Regarding</i>
Lesson plans	What I intend to teach
Grade book	The scores earned by my students
Attendance book	Who was and was not present
Faculty meeting agendas	The scope of a faculty business
PTA attendance	Parental interest in the PTA's work
Walk-through notes	Instructional activities in the building

Such a list could go on endlessly. The point is simply this: data is swirling around the schoolhouse, and this data relates to nearly everything that goes on inside. Collecting this data is much like catching fish with a net. If a fine enough net is cast, it will catch every living organism in the environment. Even if we could cast such a net in our classrooms and catch every minute thing that transpires inside, the time it would take to sift through all that data, separating that which is of value from that which is mostly irrelevant, would certainly take more time than we have available.

The fisherman solves this problem by designing a net that allows undesirable items to flow through and that hopefully retains only that which was intended. This is analogous to the task before us as we make our plans for data collection.

SECURING RESEARCH ASSISTANTS

This chapter began with a discussion regarding the time issue. Frequently, the way professors and other research scientists deal with limitations on their time is by employing research assistants, generally abbreviated as

RAs. In grant-supported research teams, the individual responsible for the study is known as the PI, or principal investigator. In most cases, RAs are highly motivated graduate students who willingly do much of the grunt work of data collection for the privilege of working alongside the PI. So, you might be asking, where are you, the poorly paid and overworked educator involved in the conduct of unfunded action research, going to find the motivated RAs to help you with your data collection? Fear not; the solution is nearer than you might think.

Earlier, we touched on the difference between providing direct instruction and facilitating learning. We mentioned that when the teacher becomes the facilitator of learning and the students perform as knowledge workers, they share the responsibility and accountability for the achievement of results.

Research in adult work settings has clearly established that when workers are involved in systematically monitoring their own progress and self-assessing their own work, performance improves (Depree, 1998; Hersey & Blanchard, 1993). This happens because when workers are delegated responsibility for monitoring their own work, they tend to hold themselves accountable to higher standards. Equally important, they tend to enjoy their work more and show more pride in their ultimate accomplishments. So when we ask our students to become the primary collectors of data (our research assistants) on their own learning and to document the activities they are engaged in, we are setting ourselves up for a classic win-win situation.

I would wager that you already know through personal experience that having students compile portfolios, self-assess their work, maintain logs and journals (on their learning activities), and prepare for student-led parent conferences is anything but a waste of time. By having the students monitor their own work, we are helping them learn and internalize what constitutes productive work as well as gain insight into how they learn best (the skill of metacognition).

It would be nice if I could say that by turning your students into RAs, you will free yourself from all data-collection responsibilities. But that isn't the case. Having RAs on staff doesn't eliminate the participation of the principal investigator in the data-collection process, but it does transform the work of the PI. As the lead researcher, the PI's job begins by fleshing out the theory (what you did in Chapters 4 and 5), determining the research questions (what you did in Chapter 6), and creating the research design: determining what data is to be collected, who will collect it, when it will be collected, and how it will be analyzed. Those are the tasks we will concern ourselves with for the remainder of this chapter. As you proceed to build your research design, our primary focus will be on strategies that

- emphasize the use of *available data*,
- emphasize data that can be collected *while you are facilitating learning*, and
- maximize the value for students of *monitoring their own performance*.

BUILDING A TRIANGULATED DATA-COLLECTION PLAN

There are no limits to the variety of things that qualify as data or the techniques that action researchers can use to collect data. There is, however, a limit to how much can be covered in one book. For this reason, we will work through the process of building a triangulated data-collection plan with a few sample strategies that are frequently used and can be efficiently implemented by school-based action researchers. To illustrate, we will return to Ms. Pioneer's action research project. As you recall, Ms. Pioneer was investigating the use of cooperative teaming as a mechanism to develop cooperative work habits as her students produced multimedia projects. While in the midst of this study, something occurred that motivated Ms. Pioneer to conduct a second descriptive action research study inside her quasi-experimental study.

During the first nine weeks of the school year, Ms. Pioneer became deeply concerned about a particular problematic student, Joann Heathrow. Joann was diagnosed as ADHD and had a history of low academic performance tracing back to her first years in school. Despite medication, her off-task behavior and academic problems continued unabated during the first quarter; and whenever the class engaged in cooperative activities, Ms. Pioneer noticed that Joann was off-task and frequently disruptive. Ms. Pioneer was at a loss as to what to do. She decided that since she didn't fully understand what was going on with Joann, she would conduct a descriptive action research study on Joann's experience in class. She chose social studies as the setting for her study, as the use of cooperative learning in this unit would likely prove problematic for Joann. She felt that if she could understand what was happening with Joann during second-quarter social studies, she might gain valuable insights on how to better meet her educational needs. She decided to frame her inquiry around the three ACR questions discussed in Chapter 6. Figure 7.2 is a triangulation matrix set up for use with the three ACR questions.

The process of constructing a data-collection plan begins by taking one research question at a time and then asking this question:

What is a source of data that could be *efficiently* collected that would provide good information to illuminate the answer to this question?

After surfacing a first answer to that question, the process calls for continued brainstorming by repeatedly asking *what is another source? And then another? And then another?* This process continues until the action researcher believes that when taken together, the multiple sources of data identified will provide a comprehensive, credible, valid, and reliable answer to that research question.

Ms. Pioneer began this process with this paraphrased version of ACR Question 1: *What exactly did the class and Joann do?*

She started by considering sources of data that were already available. She recognized that her plan book, weekly annotated to reflect what she

Figure 7.2 Triangulation Matrix: Three ACR Questions

<i>Research Question</i>	<i>Data Source 1</i>	<i>Data Source 2</i>	<i>Data Source 3</i>
What did we actually do?			
What changes occurred with our priority achievement targets?			
What was the relationship between the actions taken and changes in performance on the achievement targets?			

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actually taught, was one source of data. She realized that by cross-referencing Joann's *attendance records* with her plan book, she could determine what specific activities Joann experienced, and this could serve as a second data source. As her brainstorming continued, it occurred to her that since all of her students are required to keep their daily work in a portfolio, Joann's *daily work* could serve as a third source of data.

At this point she paused and asked herself, Will this be enough to create a credible report in answer to this question? She responded with a yes: A record of what was going on every day Joann was in attendance—as well as what she missed on the days she was absent—triangulated with the work she completed and failed to complete when she was there would provide adequate information to answer the first ACR question.

She then moved to *Question 2: What changes occurred on my priority achievement targets?* Once again Ms. Pioneer began her brainstorming with readily available information. The first thing that came to mind was her *grade book*. This is a treasure trove of data, as this is where she records grades on all assignments, quizzes, tests, projects, and student journals. She then added Joann's *daily work folder* to her list of data sources. (Note: A single data source may assist in answering multiple questions. For example, Joann's daily work folder can help answer both Questions 1 and 2.) Her thinking then shifted to include data she could collect during class while facilitating student learning. She remembered that she regularly carries a pad of paper and writes notes to herself while walking around the classroom.

She realized her *observational notes on Joann's behavior* would be data as well as the *narrative comments she wrote on Joann's assignments*. Remembering that she required all her students to *self-assess their major assignments*, she added that to her list of data sources. Last, since one of her priority achievement targets (for her quasi-experimental study) was increased productive engagement during group work, she had developed a rating scale for use

each Friday for her to indicate a *teacher rating of engagement*. The students then used this same rating scale to create a *weekly student rating of engagement*.

Once again, it was time for Ms. Pioneer to stop and consider if, when taken together, the multiple sources of data she had just brainstormed would be adequate. She looked at her list asking, Will an examination of the information in my *grade book*, *Joann's daily work*, *my written notes on Joann's behavior*, *my comments on her papers*, *her self-assessments of her work*, and *weekly comparisons of Joann's and my engagement ratings* give me a good enough picture of any changes in Joann's performance? While one can always collect more information, Ms. Pioneer was satisfied that the picture that would likely emerge from this data would capture most of the pertinent changes occurring in Joann's performance.

Now she moved to the final action research question: What was the relationship between the actions taken and any changes noted in Joann's behavior?

It immediately struck her that the data she would be using to answer the first two questions would also assist her in answering this last question. Specifically, she realized that looking at the activities engaged in (her plan book and Joann's attendance) and comparing them to what was accomplished (Joann's work, her grade book, her written comments on Joann's work, Joann's self-assessments, her anecdotal notes, and both student and teacher engagement ratings) would enable her to identify any patterns that existed between specific classroom activities and Joann's performance. In the next chapter, when our focus will shift to analysis, additional processes for tracking the relationship between actions and outcomes will be discussed.

Figure 7.3 shows Ms. Pioneer's completed triangulation matrix for the descriptive study on Joann Heathrow's second-quarter experience in fifth-grade social studies.

Figure 7.3 Triangulation Matrix: Complete

Research Question	Data Source 1	Data Source 2	Data Source 3
What did we actually do?	<ul style="list-style-type: none"> Lesson plan book 	<ul style="list-style-type: none"> Attendance record 	<ul style="list-style-type: none"> Joann's portfolio of daily work
What changes occurred with our priority achievement targets?	<ul style="list-style-type: none"> Grade book (quizzes, homework, journals, reflection papers, projects, tests, weekly assessments) 	<ul style="list-style-type: none"> Teacher observations <ul style="list-style-type: none"> Observation notes Comments on tests and papers 	<ul style="list-style-type: none"> Joann's portfolio <ul style="list-style-type: none"> Daily work Self-assessments
What was the relationship between the actions taken and changes in performance on the achievement targets?	<ul style="list-style-type: none"> Contrast lesson plans with performance data from grade book. 	<ul style="list-style-type: none"> Correlate lesson plans with observation notes and comments on papers. 	<ul style="list-style-type: none"> Correlate lesson plans with material in Joann's portfolio and Joann's self-assessments.

USING TECHNOLOGY TO COMPILE AND ASSEMBLE ACTION RESEARCH DATA

The beauty of the time-honored teacher grade book is that in this one easy-to-maintain document, a host of different types of information regarding the performance of each of our students can be compiled. In one set of columns, we have attendance data; on another column we have a record of their homework as well as quiz grades and major assignments. And the list goes on. Data input is easy. When taking roll, we simply check if the student is present or absent, and before we return papers, we jot down the grade we assigned. Of course, pulling all this together (adding up each column and figuring the averages) can take considerable time at the end of the grading period. Fortunately, many school systems have moved to computerized grade books where the compilation of statistics and the graphing of trends in student performance is made much simpler.

Those readers who don't have access to computer grade books can accomplish many of the same things by using a spreadsheet on their computer. It is now commonplace for computers to be delivered with spreadsheet software preinstalled. If you don't own spreadsheet software, it is easy and inexpensive to acquire. Basically, a spreadsheet is no more than a grade book with an unlimited number of expandable columns. However, it is superior to a hardcopy grade book in three big ways:

1. It will automatically compile statistics (such as averaging the scores in each column), making end-of-term grading easier.
2. The cells of the spreadsheet can expand infinitely. In traditional grade books, each cell is just a fraction of an inch wide, not providing too much room for data. But in a spreadsheet you can enter an entire note or comment, even copy a photograph or a scanned image of student work into a cell.
3. Last, with a spreadsheet you can easily ask the computer to compute averages for subgroups, allowing for disaggregation by gender, ethnicity, past performance, and so forth, on virtually any assignment. This is extremely helpful when you are conducting data analysis, to be discussed in the next chapter.

One really good thing about using a spreadsheet as your electronic grade book is its portability. By using a handheld PDA, a Netbook, or a tablet computer, teachers can input data as they move around the room. Technologies such as PDAs, tablet computers, and computerized writing pads now enable teachers to write longhand notes or score student work and later have them automatically converted into print for placement in their computerized grade book. With voice recognition software, teachers are able even now to dictate notes into a digital recorder or microphone and have their comments turned into text.

What enables doctors to provide personalized treatment for each one of their diverse patients is the availability of an accessible running record of all the pertinent data on each patient's condition. Of course, the doctor has

a support staff to transcribe the doctor's notes, input the lab data, and place the various items into the correct patient file. It is unlikely that we will see that type of support provided to teachers in the near future. But, fortunately, spreadsheets and portable computing technology increasingly can do nearly the same thing for the overworked educator.

This brings us nearly to the close of our discussion on Stage 3 of the action research process, *Implementing Action and Collecting Data*. It is now time for you, the action researcher, to begin the fun stuff: implementing your theory of action and collecting the data as indicated in your triangulated data-collection plan. There is only one little task that needs to be discussed before you commence action on your theory.

KEEPING A RESEARCHER'S JOURNAL

I strongly suggest that during this upcoming period of implementation, you keep a researcher's journal. Needless to say, the more observations you collect in your journal, the more information you will have available when you arrive at the final stage of the process, *Stage 4: Reflecting on Data and Planning Informed Action*. Even if your data-collection plan doesn't call for using information from a teacher's journal or if journaling isn't something you are comfortable doing, keeping a researcher's journal isn't a big commitment, and it takes very little time. In fact, you needn't even write in your researcher's journal on a regular basis. What is important, however, is that you make notes in your journal whenever you depart from the theory of action you articulated in *Stage 2: Articulating Theories of Action*. When this happens, in your notes you should indicate the date, the specific actions that differed from your original theory, and your rationale for making these adjustments.

As an educational action researcher, your first and most sacred duty is to the first part of your title, your work as *an educator*. Because that is your most important job, you should always feel comfortable deviating from your previously enunciated theory of action wherever and whenever you think it is in your students' or school's interest. However, later, when you put on your researcher hat, you will find it essential to document what actually transpired and the reasons why you may have felt it necessary to make adjustments to your theory of action. Unless you have an accurate record of what took place and why, you will be unable to learn from your experience.

Keep in mind, often the best learning comes from serendipity. You should stay open to letting this happen. Your researcher's journal will allow you to understand the significance of unanticipated events as well as enable you to share this learning with others.



Tip on Data Collection

The data-collection sources mentioned in this chapter are simply examples. You are encouraged to use them to stir your imagination, while keeping in mind that there exists a virtually unlimited universe of data-selection strategies for your use as a creative action researcher.