



Teachers as Researchers

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With new laws and increased accountability for teachers, conducting research as a teacher-researcher in one's own classroom is one means by which teachers can help increase student success and also document effective interventions. In this article, the authors provide an overview of the responsibilities and roles of a teacher-researcher and guidelines for conducting research in the classroom.

Teachers serving as researchers in their own classrooms is not a new idea. When a teacher considers evidence-based practices in making decisions or provides content based on his or her knowledge of a particular strategy or methodology's effectiveness, that teacher is conducting research. When he or she groups students based on performance, the teacher is using research. When he or she evaluates the effectiveness of different interventions for changing a student's behavior, it is a form of research. In their classrooms, teachers often perform as de facto researchers.

Teachers must go beyond becoming researchers by accident. Research should be planned and systematic, involving the collection of evidence to answer specific questions. The answers to these questions should lead to change, both in the teacher and in the progress of his or her students. In this article we introduce teachers to ways they can deliberately conduct research in their classrooms. This involves planning when, where, and how they will collect information as well as how that information, or data, may be used.

When the federal law known as the No Child Left Behind (NCLB) Act came into being, the role of teachers began to change. The cornerstone of NCLB is standards-based reform: educational outcomes are measured in two ways—student progress within the curriculum and assessment of that progress in terms of those standards. Designed with the goal of increasing academic achievement levels and closing the gap for students who are not demonstrating success in school, NCLB mandates the use of data-driven interventions and holds teachers even more accountable for student achievement. Teachers in both general and special education may therefore find that they increasingly are involved in designing interventions to assist struggling students before starting the process of referral to special education. At the elementary school level, special education teachers may be serving more as resources for their general education colleagues by providing methods and materials for these prereferral interventions. At the upper elementary and secondary levels, special educators may more often be based in inclusive settings where they must offer support in the form of strategies and methods for increasing academic, behavioral, and social success. Special educators who work in pull-out or self-contained settings will find that increasingly they must focus on producing annual yearly progress outcomes and helping students achieve the goals of their Individualized Education Program (IEP).

Regardless of grade, age, or disability level served, teachers are responsible for ensuring their students' adequate yearly progress across multiple arenas. Whether developing an educational support plan (a program for general education students who do not qualify for special education services but are struggling to meet curriculum/grade level/state assessment requirements) or an IEP, teachers must create and use assessment and interven-

tions based on active data collection. In this approach, the teacher makes decisions and implements strategies based on classroom evidence he or she gathered. Most important, this evidence is based on each student's strengths, needs, and progress. When teachers actively conduct classrooms research, ensuring adequate behavioral, social, and academic support for their students becomes more than just words; it becomes a reality.

Studies involving the teacher as researcher have demonstrated a variety of positive outcomes:

- improving student performance,
- revising practice based on new teaching and learning knowledge,
- dialoging more about instructional issues and student learning,
- increasing their own critical learning skills,
- developing innovative approaches to instruction, and
- analyzing results more objectively (Grimmett, 1996; Langerstock, 2000; Madison Metropolitan School District, 2001; Torres, 2001; Welch & Chisholm, 1994).

Teacher-researchers have several roles:

- They investigate answers to questions that arise from everyday classroom life, seeking practical solutions for improving their students' social and academic behavior.
- They look at how to change their own behavior to help students achieve (Ovens, 2000).

What exactly is involved in being a teacher-researcher, and how do you become one? Teacher-researchers practice what is formally known as *action research*. Action research may be conducted as part of a university-school partnership or independently by the teacher. The most important aspect is a question. This question is asked because the teacher wants to solve a problem or because he or she would like to know how to change some thing to be more effective. Questions can range from "What approach is best for teaching spelling to a group of learners?" to "How do I change the out-of-seat behavior of a student?" Regardless of the question, the teacher actively seeks an answer by systematically collecting evidence or data. This evidence or data then drives the appropriate change, from instructional strategies to responses to specific social or academic behaviors to classroom routines. In the rest of this article, we will suggest ways in which a teacher who wants to be an active classroom researcher can plan and conduct research.

Planning Guide for Conducting Research

Conducting useful research in the classroom requires using a systematic approach. You, the teacher, should be com-

fortable with this approach, and it should flow naturally from what is already happening in the classroom. Essentially, you use what is already being done in the classroom and translate everyday concerns into structured research questions. To help teachers determine what to research as well as how to do it, we have provided the following planning guide as a model (see also Figure 1).

Step 1. Identify the Problem/Concern to Be Researched

Probably the best way to identify the problem is to ask, “What isn’t working?” or “What can I change?” This may be based on thoughts about a particular lesson, concern regarding students’ lack of responsiveness to instruction, worry about poor time on task of one or more students, realization that a student is having difficulty in learning a specific skill, or any other of a number of classroom concerns. The point is that the question comes out of what is happening in the classroom and is an extension of what you already do. You do not need to search out research projects; the research should stem from natural occurrences in everyday teaching.

Sometimes determining which of several questions to pursue is the most difficult decision. If this happens, ask yourself, What issue is the most bothersome?

- a student behavior that serves as a personal distraction?
- a problem that affects overall classroom functioning?
- something concerning an individual student’s needs?

A good rule of thumb is to choose the question or problem that is at the top of your list and tackle only a few issues at a time. Once you have pinpointed the question, target a behavior (social or academic) for data collection. The behavior must be described in terms that are specific, objective, and measurable (see Figure 2).

Step 2. Collect and Evaluate Information From Various Sources

Information may be collected through a variety of sources. More traditional avenues include reviewing student work samples, conducting error analyses of student work, interviewing family members and others, using student opinion questionnaires, asking students how they solve problems, or having a colleague observe in the classroom (see Figure 3). In each of these instances, the underlying goal is to look for patterns, whether in terms of (a) academic performance in the way the teacher interacts with the class and presents information or (b) in student responsiveness to instruction. Less often used, but equally important, are observational data recording systems (see Figure 4). These systems allow for observation and recording of behavior as it occurs in the classroom and are particularly useful in an-

- Identify the problem/concern to be researched.
- Collect information from various sources and evaluate it.
- Develop a plan for intervention/change.
- Implement the intervention/change and collect data.
- Analyze the data/evaluate the results of the intervention or change.
- Plan for future action: keep, revise, or alter the intervention.

Figure 1. Planning guide for conducting research.

Targeted behaviors need to be:

- **Specific:** are clear enough so that two independent observers would count the same number of instances of behavior—define it
- **Observable:** see it
- **Measurable:** count it in some fashion
- **Voluntary:** can be changed

Nonexamples:

Be disruptive
Be respectful

Examples:

Talk out
Out of seat
Raise hand
Use “please”

Figure 2. Targeted behaviors: What they are and what they are not.

alyzing questions that address student response to instruction, student engagement, and certain student behaviors.

Deciding which data collection method to use should be based on the type of behavior being targeted, including its frequency and intensity. For example, a low-incidence behavior with a definite beginning and end (such as “raise hand”) may best be measured by event recording because it is easily counted. On the other hand, an ongoing or high-frequency behavior (such as a self-stimulatory behavior) may best be measured through use of time sampling. Because it is difficult to count each instance of a high-frequency or ongoing behavior, you should periodically check (time-sampling) to see if the behavior is occurring. This will give you a fairly accurate picture of the behavior without becoming overwhelmed by the collection process.

You should consider several other variables when deciding on a data collection method:

- Is a history of the behavior important in learning about a student’s previous performance?

- Is the issue you are researching a home-to-school issue?
- Do you believe the behavior (social or academic) is best dealt with by collecting information through student surveys or interviews?

In other words, the key is to decide which evidence will best answer the question being posed. For example, when the targeted behavior is “engaged in activity,” you may want to do one of the following:

- look at student engagement and nonengagement through a functional behavioral assessment in which the antecedents and consequences are examined;
- examine which grouping of students or classes are more or less engaged in learning;
- interview the student to see why the behavior is happening;
- use time-sampling to note when the student is engaged; or
- select a combination of these methods. You make the decision about how to gather information to answer the research question you posed. The behavior may often give you the answer as to which data collection method to use, particularly in observational systems. Keep in mind why you are collecting data (see Figure 5), when and where you will collect the data, and how you plan to use it.

Finally, you must keep two things in mind:

1. Your job is to teach, and your data collection should not interfere with this primary role.
2. Do not change your behavior during the data collection phase because it may influence the results. If a paraprofessional or volunteer is available, have him or her collect data for you. Unfortunately, many teachers do not have this option but keeping the thought firmly in mind should help lessen the possibility of corrupted data.

Once you have determined the behavior and the data collection method, you have to consider when and where data will be collected. Take into account the potential influence on the behavior of different environments, classes/subjects, groups, activities, and teachers. Maximizing the picture of the behavior and the quality of the data obtained may involve collecting data at different points in time during the day and week. For example, a student might stay on task during morning activities but not during the afternoon. Evaluating what is different during those times (instructional content, time of day, groupings, instructional delivery) and collecting data during different activities may help you decide which intervention might be most effective. In another case, a student may be very engaged when working in groups but

- Data that will directly assist in answering the research question
- Data that will be replicable (can be done again)
- Data that may already exist (in files or records)
- Data that are part of regular classroom activities, so collection can be built into the classroom routine
- May include the following:
 - Interviews (with family, student, other teachers)
 - Checklists
 - Observational recordings
 - Portfolios of student work
 - Videotaping or audiotaping
 - Functional behavioral assessment

Figure 3. The type of data to collect.

- **Event Recording**—an exact measure of behavior
 - √ Use for discrete behaviors (those having a definite beginning and end)
 - √ Count/tally how many times behavior occurs
 - Examples: raise hand, call out, ask question
- **Latency Recording**—an exact measure
 - √ Measure how long it takes to begin something
 - Examples: follow directions, begin work
- **Duration Recording**—an exact measure
 - √ Measure how long a behavior persists
 - Examples: temper tantrum, out of seat
- **Time Sampling**—an estimate of behaviors
 - √ Use for ongoing or high-frequency behaviors
 - √ Record whether behavior is or is not occurring at the end of every specific period of time (e.g., every 30 seconds) for a specific session (e.g., a session of 5 minutes at the beginning of class)
 - Examples: talk to peers (if high frequency), stay on task

Figure 4. Observational data recording systems.

have difficulty getting work done when on his or her own. If you only collected data at times when the student was not completing work, you would lose a valuable piece of information about that student’s preferred learning environment that might be important in planning an intervention.

You are now ready to determine a way to keep track of the data to make it easy to arrange and analyze. One

- To answer a research question
- To determine whether the behavior is really a problem—determine the severity
- To determine the level/intensity of the behavior
- To create a baseline (or current “picture” of the behavior) for comparison with intervention results
- To obtain information about the possible function (purpose) the behavior serves for the student
- To assist student(s) in looking at own behavior
- To assist the teacher in determining his or her behavior
- To objectively evaluate the behavior
- To provide a clear image of the behavior’s progress for teacher, family, and student when graphed or presented in some visual format
- To assist in planning for intervention

Figure 5. Why collect data?

possibility is a data collection sheet. For observational recording systems, you may want to design your own data collection sheets, or you may select from a number of commercially packaged products (e.g., Sprick & Howard, 1995). Alternatively, you may decide to collect by some other means and then transfer the data at the end of the day. An example of an alternative means would be to tie a knot in a piece of string each time the behavior occurs (see Thompson, 1997, for other alternative means for collecting observational data). Having selected a system by which to record the data, developed a means of keeping track of what is recorded, and decided when and where to collect, you can now begin the phase of collecting information to answer the research question.

Step 3. Analyze the Data

After collecting various data to answer the targeted question, charting or graphing it to have a visual representation, particularly of observational data, is often the most effective approach to analysis. With a visual representation, you can see what is happening with the behavior, such as when it occurs most often, and can use that information to assist in planning intervention. Anecdotal records accompanying the data can lead to additional reflections on possible ways to intervene. You now organize the data for analysis, look for patterns or themes, and arrive at possible answers to the research question. Remember to include all data, not just that which seems to “fit” with the original hypothesis. For a student who is not engaged, the data may show that it is not that the student just “doesn’t like the class” as previously reported by the student and hypothesized by the teacher; instead, the stu-

dent doesn’t speak in class or answer any questions but does take notes. When asked to use that information in some type of written response, the student doesn’t do it. The data may show that this person makes a start on accomplishing the task but is unable to organize his or her thoughts to actually complete it. A potential intervention might be teaching the student a means for brainstorming and organizing ideas. Had you merely looked at the student from a nonengagement perspective, you might have decided to reinforce engagement. Although this approach might have worked, in all likelihood it would have been unsuccessful because the student did not have the skills to be engaged/complete the task. No amount of reinforcement would have changed that behavior. Teaching a necessary skill, however, might work. This is only one example, but it reflects the necessity of looking at and analyzing data from several different perspectives and including information that may not match the assumptions you held when starting the process of researching a question.

Step 4. Develop a Plan for Intervention/Change

Once you have analyzed and established a baseline on the behavior, you may begin generating hypotheses for intervention strategies. There are several points you should remember:

1. Most important is evaluating the patterns in terms of your own behavior. Is there something that can be done to change your behavior to help increase or decrease the student’s behavior? Examples include
 - how you respond to the student,
 - how instruction is conveyed, and
 - how routines are established and maintained.

After considering potential interventions in terms of classroom structure and provision of instruction/teacher interactions, you may decide everything has been done in these areas and the student’s behavior needs to change.

2. If you decide to remove or cause a behavior to cease, you need to be sure that the student has a replacement behavior that will meet the same function. This new behavior(s) must be reinforced at the same level as the behavior you are trying to change.

Figure 6 offers a sampling of choices you may make in deciding on an intervention. An example of a teacher working through this process is provided at the end of this article.

Step 5. Implement the Intervention/Change and Collect Data

During the intervention, you must continue collecting data as in the initial data collection phase. Continuing to

- Teach a replacement behavior the student already has that will serve the same function
- Teach a cognitive strategy
- Change own teaching behavior
- Provide a peer to assist the student
- Reinforce lower rates of the behavior (if want to decrease)
- Modify instruction: type or length of task
- Modify response required
- Teach self-monitoring and self-regulation
- Make sure to address A-B-C (prevention of–replacement of–reaction to behavior)

Figure 6. Intervention options.

collect data in exactly the same way will help you make comparisons between the behavior prior to intervention and the behavior during intervention. This information is vital to evaluating whether change has occurred. Without it, you have no clear proof that the intervention is working or that your research question is being answered.

Step 6. Analyze the Data/Evaluate the Results

At this point, you should chart the data or present the data in whatever form, visual or otherwise, that you used in your initial data analysis. From this, you can

- see if there is any change in the behavior,
- determine whether this change appears tied to the intervention, and
- use the information to either continue with the intervention or stop it and seek another approach.

A general rule is to collect and chart data until a pattern can be established. If the data line is flat, there is no change. If it increases or decreases, there is change that may be tied to the intervention. Obviously, if it is a behavior you want more of, an increasing line is a positive. A decreasing line suggests deterioration in the behavior and may indicate that the intervention approach is not working and another intervention should be tried.

Step 7. Plan for the Future: Keep, Revise, or Alter Intervention

Based on the data analysis after the intervention has been implemented and data have been collected for a long enough time to determine a pattern, you can now plan for future action. It may be that the research question has been answered, the intervention as designed will continue,

and you are off to explore a new research item of interest to your classroom. On the other hand, you may find that the intervention does not appear to be working. In that case, you should go back to the initial data collected and the intervention list generated, select a different intervention, and begin the process again. It may be that the intervention is, in fact, making a difference but that you want a greater change and decide to revise the intervention or add something additional in an attempt to effect that greater change. If either of the latter two is what you choose, you must return to the steps of implementing an intervention, collecting data, and analyzing these data to determine if the new or additional interventions are making a difference. Although this seems potentially time-consuming, when you consider the time spent in dealing with classroom issues and student behaviors that may create concern, the process of engaging in active research is often ultimately less time-consuming and certainly less frustrating than dealing with whatever led to the plan for action research in the first place. Experience has shown that teachers who actively research to seek answers to classroom-based questions and then find and apply interventions based on data are more likely to have not only more successful classroom experiences for themselves but also greater social and academic learning gains for their students.

Using the Planning Guide: An Example

To demonstrate how one teacher brought together the pieces of this planning guide for answering a research question, we provide an example here. Martha is a third-grade student who routinely does not complete assignments in class and is in danger of failing. In addition, Martha's seeming inattention and frequent requests for help are beginning to irritate her teacher and her classmates, which could lead to negative social consequences. Martha's teacher also finds Martha's behavior distracting, worries that too much time is spent on this one student, and has noticed that as she repeatedly answers Martha's questions, the rest of the class drifts off task.

The teacher decides that something must be done to change the situation and decides to research potential answers. Using the planning guide, Martha's teacher takes the following steps. First, she asks herself, "What can I do to help Martha complete her work?" This leads her to reflect and generate several subquestions:

1. Is this a behavior that serves some function for Martha, such as getting attention, and do I supply attention?
2. Is it possible that Martha has difficulty in focusing on and attending to spoken and written directions, and do I make them clear enough?

Student Name: *Martha*

Targeted Behavior(s): *Ask question; respond to*

Date(s): *M-F, Sept. 4-8*

question; prompt to begin

Location: *Language Arts Class*

work; offer help; begin work

Event Recording (tally marks)

<i>Behavior</i>	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>
<i>Ask question</i>					
<i>Respond to question</i> (code: T = teacher, S = any student)					
<i>Prompt to begin work</i> (code: V = verbal; G = gesture; E = look)					
<i>Offer help</i>					

Behavior: *Begin Work*

Latency recording (time prompt & time began)

Day of week	Prompt time	Begin work time	Latency

Figure 7. Martha's data collection sheet.

3. Should I look at the fact that Martha rarely completes work because she has difficulty in getting started?

After some consideration, the teacher determines that the specific, observable, and measurable behaviors on which she will collect data are as follows: “begin work,” “ask questions,” “respond to questions,” “offer assistance/give attention,” and “prompt to begin work.” The first two pertain to Martha’s behavior, the other three to the teacher’s behavior.

Martha’s teacher then selects data collection methods. First, she decides to use *latency recording* to keep track of how long after receiving an assignment Martha starts working. She then selects *event recording* as the most efficient means to record the number of times Martha asks questions and the number of times a response is received (either from a classmate or the teacher). On reflection, Martha’s teacher decides to also use event recording to tally the number of times she indicates to Martha to get to work (using some type of prompt, whether verbal, gestural, or eye gaze), as well as how often she offers Martha assistance.

Martha’s teacher then designs a data collection sheet (see Figure 7) that she thinks will be easy to use and that addresses the various subquestions (targeted behaviors). Once this is completed, the teacher decides when and where to collect data. In this case, she decides that language arts class is where she feels most frustrated by Martha’s behavior, so that is where she’ll start. The teacher is now ready to collect data that, when analyzed, may help guide her in planning an intervention strategy.

Martha’s teacher collects data for a week, charting these data each day. She begins to see a pattern that leads her toward designing an intervention. Specifically, she realizes that Martha asks about 10 to 15 questions during the half-hour period. She also sees that Martha generally receives a response of some kind, either from another student or from the teacher. Based on these data, the teacher hypothesizes that perhaps Martha does not understand or is asking questions as a way of getting attention. When looking at how often she prompts Martha to begin work, the teacher sees that she does this several times during each class period. The teacher also sees that after a few prompts, she generally goes over and offers Martha assistance with the assignment. Usually this is in the form of re-explaining the task, helping Martha get organized and focused, and “jump-starting” Martha on the assignment. The teacher also observes in the data that the faster she answers questions and assists Martha, the shorter the latency to begin work. Again, the teacher considers the possibilities of attention seeking and a lack of understanding on Martha’s part. After further reviewing the data, the teacher realizes, based on her notations about the type of questions Martha asks, that many of the

- Use response boards
- Adjust length of task(s)
- Alter type of task(s)
- Break up task(s)
- Teach self-monitoring/self-regulation
- Create a special organizational system
- Evaluate skill level
- Reteach or alter workload
- Use different reinforcement
- Paraphrase directions to ensure comprehension
- Provide a peer buddy
- Provide choices for task order/completion
- Teach a strategy

Figure 8. Possible interventions for Martha.

questions are about what to do and how to do it. The teacher now must decide on a course of action.

Martha’s teacher considers several possible interventions (see Figure 8) in order to come up with a plan to answer her research question, “How can I help Martha complete her work?” After considering the various choices, she decides to implement several different changes in the way the language arts classroom is run.

1. She decides to alter her own behavior. Rather than providing the assignment and then asking, “Any questions?” she decides she will ask specific questions about the assignment and institute the use of response boards for student answers. She believes this will engage students and also give her a quick way to see if the students, including Martha, understand what it is they are to do.
2. She asks various students to rephrase the assignment in order to ensure understanding.
3. She pairs Martha with a buddy who is strong in language arts and who can serve as her mentor.
4. In order for Martha not to stand out, the teacher creates teams of all the students in the room.

In sum, the teacher hypothesizes that by providing Martha and her classmates with more information about the task and clearer directions, as well as setting up pairs to support one another, the students—and especially Martha—will be better able to complete their work.

The teacher now starts implementing her plan. During this time, she continues to collect and chart data on Martha’s behavior and her own as was done during the baseline phase. The teacher will use these data to deter-

mine if the intervention is effective by comparing the initial data to data collected during the intervention. Martha's teacher collects data for 2 weeks. Although it appears that her interventions initially cause some confusion and disorganization in the classroom, after the first week the system seems to be working pretty well. Specifically, when she looks at the data, she observes that Martha is asking fewer questions, seems more engaged, and gets her work done more consistently. As an added bonus, Martha's teacher notices that the entire class seems to be working together in a more positive manner and that the work of a number of her students is improving. She realizes that by changing her behavior, changing her way of asking questions, and pairing students, all students have benefited. The research project—addressing an everyday problem in the classroom and applying simple behavior change after data collection—seems to be complete. Now Martha's teacher is ready to move on to her next concern and design a new action research project.

Conclusion

As noted in the introduction, to be effective, research needs to be planned and systematic, involving the collection of evidence to answer questions. In the case illustrated in this article, the answers to a question led to change, both in the teacher and in the progress of the students with whom she works. All teachers can deliberately conduct research in their classrooms by planning when, where, and how they will collect information, as well as how that information will be used. All it takes is a willingness to ask the questions, collect the data, and try new approaches based on what the data reveals. In the current environment of evidence-based practices and teacher accountability, being a teacher-researcher is a potentially easy and efficient way for teachers to effect change in their classrooms, increase student success, and collect the measurement data to prove it.

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