

Action Research to Improve Teaching and Learning

by Roberta Ross-Fisher



For teachers and administrators, action research is a user-friendly, practical approach to conducting research.

- Third-grade teachers have approached me wanting help for their students. I need to be able to speak to them with confidence to the question: What strategy works best to improve reading fluency?
- I saw an interesting graphic organizer in a recent workshop; will it really help my students to be more successful with non-fiction text?
- After examining our grade level's end-of-year assessment results, we have identified one major area of focus: What is the best method for teaching one-digit multiplication?
- Student attendance has been low over the past six months; what can we do as a school to encourage children to come to school each day?

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These questions are common concerns of K-12 teachers and administrators. More than ever, educators across the United States are held accountable for their students' learning and subsequent performance on high-stakes tests. Teachers and administrators must be able to identify clearly what techniques are effective at improving student learning, which ones are not, and how to develop a set of successful instructional practices based on that knowledge (Airasian 2001).

Research is not typically something that many K-12 teachers think about as part of their regular planning regimen. Many teachers are so focused on getting through each day that the mere thought of trying to incorporate research into their professional practice may seem daunting and unrealistic. That may be true for traditional forms of research driven by quantitative and qualitative data analysis; those types of research commonly are very involved and formal, often taking many months and even years to complete. Sample sizes typically need to be large (particularly with quantitative designs). Results are shared usually in the form of scholarly writing through peer-reviewed journals or in research-focused professional conferences (Mason, Lind, and Marchal 1991).

Action research, on the other hand, presents a more user-friendly, practical approach to conducting research. Using this model, which is generally less formal than other types of research, teachers and building administrators conduct research for one main purpose: to improve teaching and learning (Slavin 2006). Action research can

involve a single teacher or a collaborative team of two or more teachers working together to focus on a mutual topic. Action research projects can take on an even larger scope by involving all teachers within a specific grade level, a particular department, or an entire school.

Another major difference between the action research model and traditional forms of research is sample size; it is possible to conduct action research with a single student, if necessary. Further, the way results are shared can vary from traditional research. Though sharing results could involve formal publication in journals or presentations at conferences, reporting might consist of much less formal means such as faculty meetings, professional development workshops, or publication on the school district's Web site. Moreover, an action research project can span only a few weeks, or it can last an entire school year and beyond.

Identify the Problem

Some basic steps comprise the K-12 action research model (Sagor 2000). First, the teacher/researcher will identify the problem. Problems occur every day at school. A teacher does not have to look far to find them. Examples of problems might include areas such as:

- poor attendance;
- lack of parental involvement;
- writing skills that do not meet grade-level expectations;
- reading comprehension skills that prevent a student or a group of students from passing content-area assessments;
- bullying or aggressive behavior on the playground;
- poor performance on specific mathematics subtests; or
- an entire grade level that scores below expectations on decoding skills.

The process of narrowing down a topic involves looking for patterns in a recurring problem. For example, if a teacher observes a problem once or twice, it may be a concern, but not significant enough to warrant an action research study. If, however, a difficulty lingers, the problem might be a good choice for the focus of an action research study.

After the problem is identified, it must be articulated clearly. After stating the problem, the teacher/researcher should be able to answer these questions: How do you know this is a problem? On what are you basing your belief? What evidence do you have that this is truly a problem worth investigating?

Questions

The next step is the formation of specific researchable questions. Typically, three to five questions are common for most K-12 action research investigations. Constructing

the wording of these questions appropriately is important; each question should be as narrow, as specific, and as researchable as possible. Avoid framing questions that are vague; they must be answerable through collection and analysis of data after administering a specific "treatment" or instructional strategy over a predetermined period. To develop a set of appropriate action research questions, the following elements are necessary: the student population, the desired result, and the specific strategy for achieving the end result.

Here are some examples of questions for consideration for action research investigations with a literacy focus:

- Will students' desire and attitudes toward reading change if they are shown some kind of success?
- Is it possible for students to incorporate the use of word walls in all areas of their education?
- Will providing my students with daily practice actually help them to achieve success?
- Will implementing the three-cueing system with first- and second-grade Title I Reading students increase flexible reading skills and lead to higher reading levels?
- Do interactive word walls improve the quality of writing journals for kindergarten students?
- Will the use of graphic organizers help improve my tenth-grade students' performance on social studies unit tests?

Notice the significant difference in the wording among these sample questions. In the first three, the language is ambiguous and confusing. Not all of the three required elements are apparent (student population, desired result, and specific strategy for achieving the end result). Achieving a successful action research project would be quite difficult using those questions in their present form. The last three questions, on the other hand, each contain all the information necessary to conduct a successful action research project. Each one clearly identifies on whom the project will focus, the specific intervention, and the ultimate goal.

Now reconsider the first three questions presented earlier to see how some modifications make them more clear and appropriate for action research:

- Will the daily implementation of the "bless the books" strategy improve the reading interest and motivation of second-grade students?
- Does the use of interactive word walls improve the quality of fourth-grade students' writing samples?
- Will providing my eleventh-grade American Government students with weekly practice using the jigsaw strategy elevate their unit assessment performance?

Construction of the research questions is perhaps the most crucial element of planning relative to a successful research design. As questions are being formulated, consider how those questions could be answered. For example, a question that can be answered by consulting a textbook or by reading a journal article is not appropriate for action research. To fit the model for action research, an actual strategy, technique, or "intervention" intended to elicit change must be implemented for a specified length of time.

Table 1 provides a useful format for planning action research questions. Before generating the wording of questions, clearly identify specific elements of the desired result, how the desired result will be attained, the specific student population, and how the questions could be answered. After drafting this information, the process for writing questions is relatively simple.

Review of Related Literature

After research questions are drafted, the next step is to conduct a review of related literature (Pyrzczak 1999). What investigative work on the chosen topic already has been conducted by colleagues respected within the profession? If the research questions already have been answered, studying them again may be redundant. Many times, reviewing the work of others also provides insight regarding what additional avenues could be explored.

Focus of the review should start from a broad scope and gradually become narrower, similar to that of an inverted pyramid. Consider, for example, the research question: Will KWL improve my sixth-grade students' performance on science and social studies unit tests? A review of literature would begin very broad in scope, perhaps investigating effective teaching practices relative to content areas. The review then would delve into

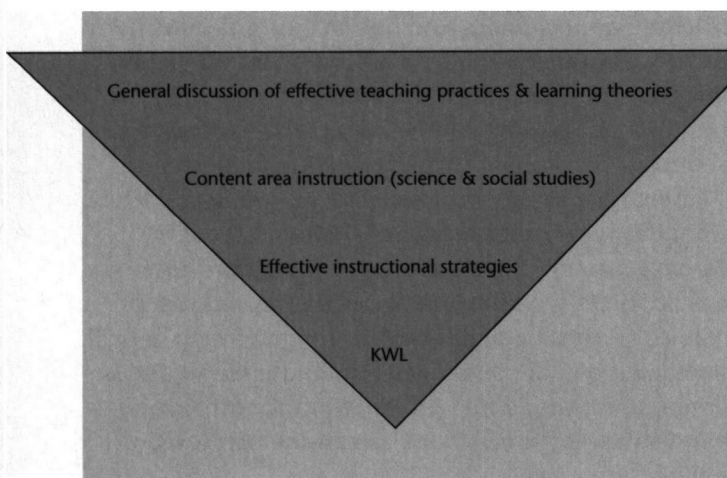
Table 1. Constructing Action Research Questions

Example	1	2	3
Desired End Results	Improved performance on science and social studies unit tests	Improved motivation	Improved quality of writing skills
Method for Achieving the Desired End Results	KWL	SMART Board™ technology as an instructional medium	Peer writing and review
Specific Student Population	Sixth-grade students	Fourth-grade struggling readers	Ninth-grade English class
How the Question Could Be Answered	Administer a pre-test in science and in social studies to get baseline data. Work with students using KWL for eight weeks. Administer a post-test in science and social studies to determine growth and progress. The instrument should be the same (testing the same skills), but should not be the identical version.	Administer a student motivation survey or reading interest inventory to gather baseline data. Work with students using the SMART Board as an instructional medium for four weeks. Administer the student motivation survey or reading interest inventory to determine change in motivation levels.	Take a writing sample and evaluate using an approved writing rubric. Work with students using the peer writing and review process for one quarter. Take another writing sample and evaluate using the same writing rubric as was used to gather the baseline data.
Possible Question	Will KWL improve my sixth-grade students' performance on science and social studies unit tests?	Does the daily use of a SMART Board serve to improve the motivation of fourth-grade struggling readers?	Can peer writing and review improve the quality of writing skills demonstrated by my ninth-grade English class?

specifics about science and social studies teaching and learning, respectively. Gradually, the review would become more focused on specific instructional strategies; and finally, on KWL specifically.

By the end of the literature review, the researcher should have identified: (1) what other respected sources have written about the topic; and (2) how the planned strategy, technique, or approach for the project shows promise for success. Using the concept of the inverted pyramid, as shown in figure 1, the conclusion of the literature review should practically be "pointing" at the intended strategy.

Figure 1. Inverted Pyramid Concept



Methodology

After conducting the review of related literature, the next step is to clearly define what specific methods will be required to answer the research questions. The methodology is important because it must align with what is being asked (Salvia and Ysseldyke 2001). In other words, the "how" must fit with the "what" in the design of the action research study. This element of the action research design states exactly what data will be collected, how it will be collected, and how it will be analyzed.

In traditional forms of quantitative research, large sample sizes are common and standardized test scores often are a primary data source. Many times, researchers attempt to draw comparisons between two or more groups. Specific inferential statistical methods, such as a two-tailed test (otherwise known as a t-test), Spearman's rank-order correlation coefficient, and analysis-of-variance (ANOVA), are methods commonly used for analyzing data of standardized test scores (Patten 2000; 2001).

Also in traditional research, qualitative research designs typically have smaller sample sizes. Data sources tend to be from focus group interviews, questionnaires that contain many open-ended questions, classroom observations, and examination of student portfolios. Researchers also may use descriptive statistics, such as population mean, median, and mode, for analyzing data (Pyrzczak 1999).

Action research, in contrast, typically involves sources of data such as teacher observation, examination of student work samples, interest inventories, and performance on either teacher-created assessments or commercially produced instruments. Analysis of data might be completed through some type of coding or through construction of criterion-referenced scoring guides or rubrics. A model such as "Rubrics for Success" might be appropriate for an action research investigation, particularly if numerical values were assigned to each level of success (Ross-Fisher 2005).

Regardless of which type of research is conducted, a timeframe should be established for carrying out each element. Setting these parameters helps the teacher/researcher to remain organized, focused, and on schedule.

Analysis of the Data

After the problem has been clearly defined, research questions have been framed, the related literature has been reviewed, and data has been collected, the next step is analysis of the data (Strauss and Corbin 1990). As previously mentioned, the use of criterion-referenced rubrics or other types of rating scales usually works well with action research, as do teacher-made tests, observation checklists, and other comparable approaches. Certainly, when larger sample populations are present, using some form of inferential analysis is possible; but formal methods, such as those employed in quantitative designs, are not typical of action research.

Keys to look for in action research investigations are patterns of evidence—trends—over the duration of the study. As a reminder, the underlying premise of action research is to improve teaching and learning. To accomplish that goal, the teacher/researcher must determine whether and to what extent the intended result is occurring within the context of the specific strategies or techniques employed in the investigation.

A common way to ascertain the impact of a technique is to look at the pre- and post-assessment data and compare the two. Has there been growth? If so, how much? If not, how little, and why? What

are the patterns of evidence that lead to this conclusion? Is this trend applicable to just one student in the group, to specific students, or to the entire class? In short, use the available data to "wring out" as much information as possible. Presenting the data in charts, graphs, or tables is appropriate and useful.

After the data has been thoroughly reviewed and analyzed, each research question should have been answered and conclusions should have been drawn. If they have not, then another data review is necessary. If information still is not available to answer the questions, this may indicate that there was a flaw in the study design and that different data collection methods are necessary (Pyrszak and Bruce 2003).

As with all research designs, action research does have its limitations. For example, if a strategy is used with only one or two students, the effect of that strategy cannot be assumed for the entire class. The duration of an action research project also has an impact on the strength of results; a study conducted for a period of two or three weeks is not as conclusive as one conducted for 10 or 12 weeks. Additionally, one must be careful to isolate the specific strategy being used as the "treatment" during the action research study so that the impact of that strategy can be determined with confidence. For instance, suppose that the desired end result is to improve reading comprehension, and the strategy being used is KWL; however, students also are exposed to other techniques, such as the DRTA and graphic organizers. In this example, it may be difficult to know with certainty which strategy had the greatest impact on improving student comprehension. Therefore, conclusions cannot be drawn with confidence about information that was derived from the data.

Next Steps

After data has been analyzed, research questions have been answered, and conclusions have been drawn, it is time to draft a plan of action for the future and reflect on the experience (Sagor 2000). This process might elicit a change in instructional strategy connected with a particular unit of study, or perhaps a modification in curriculum for a specific skill, or maybe even a variation of the sequence in which students are presented with certain concepts. A plan of action also could involve recommending ideas for future research by the teacher/researcher or building colleagues.

Reflecting on the entire experience near the end of an action research project is also important. What were specific strengths of the study and why? What

were specific weaknesses of the study and why? How does one know? What would one do differently next time if given the chance to repeat the investigation? To engage fully in this type of reflective practice, the teacher/researcher might maintain a daily log or journal that includes not only what took place, but also anecdotal information and additional questions or concerns.

Don't Forget to Share!

After the entire action research investigation is carried out in its entirety, one last step needs to take place—that of sharing and disseminating what has been learned with colleagues. As mentioned earlier, the primary purpose of action research is to improve teaching and learning, and not just for one classroom exclusively. What a shame it would be for a teacher/researcher to glean insightful information about how best to teach writing, or decoding, or long division, and then never share that information with others!

What are the most effective ways to disseminate what has been learned through action research? Perhaps a faculty meeting after school, a professional development workshop, or an article on the school's Web site might be appropriate. Presentation at a local, state, or regional conference also might be an option. A narrated PowerPoint® presentation sent throughout the district via e-mail could be considered. The possibilities are endless.

How educators go about sharing is up to them. The important thing is to let others know what was done and what was learned. Not only will the information allow colleagues to apply findings from the research, but it also may open the door for future collaborative action-research projects that will continue the cycle of improving teaching and learning. ■

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