In Search of Scientifically Based Research

What is scientifically based research and where can you find it?

George J. Hademenos

Principals confront formidable challenges and obstacles posed by the requirements of No Child Left Behind, not the least of which is the law’s requirement that the strategies and techniques they use to ensure academic success for their students must be based on scientifically based research. Which begs these questions:

Where would a principal search for scientifically based research?
What are the criteria for determining whether a research study is scientifically based?
How do you know if a particular strategy is validated by scientifically based research?
Finding Scientifically Based Research

Documenting evidence of an instruc-
tional strategy’s scientific base requires searching for the right source in the right place. The right sources for scientifically based research are typically those from established authorities, such as federal and state governments, scholarly publications, and professional organizations. On the Internet, limit your search to addresses ending with .gov, .edu, or
While an Internet search might find a number of other sites that support or refute a particular initiative, principals should not only make sure that the source of the supporting research is sound, but that the research itself was designed and conducted in a manner consistent with scientific protocol.

There are no objective criteria to determine if a research study is scientifically based, but the way the study is designed can statistically strengthen its results and increase the probability of its validity. Ask yourself these questions:

**Has the intervention been studied before?**
If not, then ask what is the basis for its success in a specific area or discipline. Where did the idea come from and does it make sense that the proposed intervention would positively impact the problem being studied? If the intervention has been studied before, how many times has it been studied? The more studies there are on a particular type of intervention, the more likely it will be successful. But beware of studies relying mainly on anecdotal observations, even those of respected colleagues. Their claims of success probably come from gut feelings—definitely not the basis for scientifically based research.

**How were the study groups formed?**
As you read descriptions of research studies based on subject pools, note whether the subjects were randomly assigned. The ideal scenario is to randomly assign students in a blinded study, in which the students do not know whether they are in the treatment or control groups, or a double-blinded study, in which neither the students nor the education researchers know which students are in the two groups. Group studies that are blinded or double-blinded are much more reliable; it has been documented that study results are skewed when students are aware of their participation.

**How many students were involved in the study?**
Did the study involve 30 students, 300 students, or 3,000 students? The more students involved, the more valid the evaluation and interpretation of the overall results. If the outcome of a studied intervention shows that 85 percent of the participants improved, that percentage is much more significant when measured against 3,000 students rather than 30. However, there is no clear number that justifies or validates the findings from a particular subject pool.

**What were the characteristics of the studied school?**
Consider the size, location, and student demographics of a school described in a research study when exploring the feasibility of implementing the intervention at your school. If a potentially promising intervention was conducted in an upper-middle-class suburban school with a majority of white students, proceed with caution in attempting to replicate it in an urban or rural school with a majority of black or Hispanic students. Look for studies testing interventions in a student popu-
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population that closely mirrors your school’s size, location, and demographics.

Do the results make sense? Although the results represent an intervention’s success, they can be misleading. Let’s say that a researcher’s report on a strategy showed that 90 percent of students improved their reading scores. Although that is an impressive percentage, it tells us nothing about how much scores improved. What were the baseline scores that were used to measure success? A 1 percent improvement from baseline scores, even though it was reflected in 90 percent of the student population, does not represent an impressive impact. A 20 percent improvement is much more impressive, regardless of baseline values, and could offer an excellent opportunity for success at a school with similar demographics. But beware of studies that report either a very high level of success or improvement from baseline. If it seems too good to be true, it probably is.

Is the study totally free of bias? Anyone who has a vested interest in the outcome of a research study or stands to receive financial gain as a consultant, developer, or product manufacturer should not be involved in the design, execution, and analysis of the study, particularly if the results reflect a high degree of success.

What Will Work for Your School?

Even if an intervention’s success is supported by rigorous scientific studies, whether it would work for your school is a decision that only you can make. Although there are no well-defined criteria, here are some steps principals can take to identify interventions that might work for them:

1. Identify clear instructional weaknesses within a particular subgroup or curricular area;
2. Propose possible solutions (interventions) to address these weaknesses;
3. Review the educational literature (e.g., books, monographs, and professional journals), paying special attention to scientifically based studies that most closely reflect the demographics and geography of your school;
4. Discuss the pros and cons of implementing such an intervention with the school or district instructional specialist and any relevant staff; and
5. Test the intervention in one or two classes prior to schoolwide implementation.

Searching well-designed, scientifically based studies for an intervention that addresses the needs of a particular school greatly increases the likelihood of success. However, one cannot assume such an intervention will work with any particular group of students in any particular situation. It is ultimately the principal’s decision. I hope this article will help guide the principal in making that decision.

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WEB RESOURCES

There are a number of reliable sources for scientifically based research, including the following:

**Federal Government**
- U.S. Department of Education
  - www.ed.gov
- National Center for Education Statistics
  - http://nces.ed.gov
- What Works Clearinghouse
  - www.whatworks.ed.gov
- Guide to Evidence-based Practices
- Office of Educational Research and Improvement
  - www.ed.gov/offices/OERI/research.html
- Education Resources Information Center (ERIC)
  - www.eric.ed.gov
- National Center for Education Information
  - www.ncei.com
- National Library of Education
  - www.ed.gov/NLE/index.html

**State Governments**
- List of state departments of education
  - http://wdcrbcolp01.ed.gov/Programs/EROD/org_list.cfm?category_ID=SEA
- State education data profiles
  - http://nces.ed.gov/programs/stateprofiles
- Regional Educational Laboratory Network
  - www.relnetwork.org
- Education Commission of the States

**Scholarly Journals**
- American Journal of Education
  - www.journals.uchicago.edu/aJe
- The Journal of Educational Research
  - www.heldref.org/jer.php
- Review of Educational Research
  - www.jstor.org/journals/00346543.html

**Professional Organizations**
- American Educational Research Association
  - http://aera.net
- Phi Delta Kappa International
  - www.pdkintl.org/sitemap.htm
- National Association of Elementary School Principals
  - www.naesp.org
- Association for Supervision and Curriculum Development
  - www.ascd.org

**Curricular Organizations**
- National Council of Teachers of Mathematics
  - www.nctm.org
- National Council of Teachers of English
  - www.ncte.org
- National Science Teachers Association
  - www.nsta.org

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