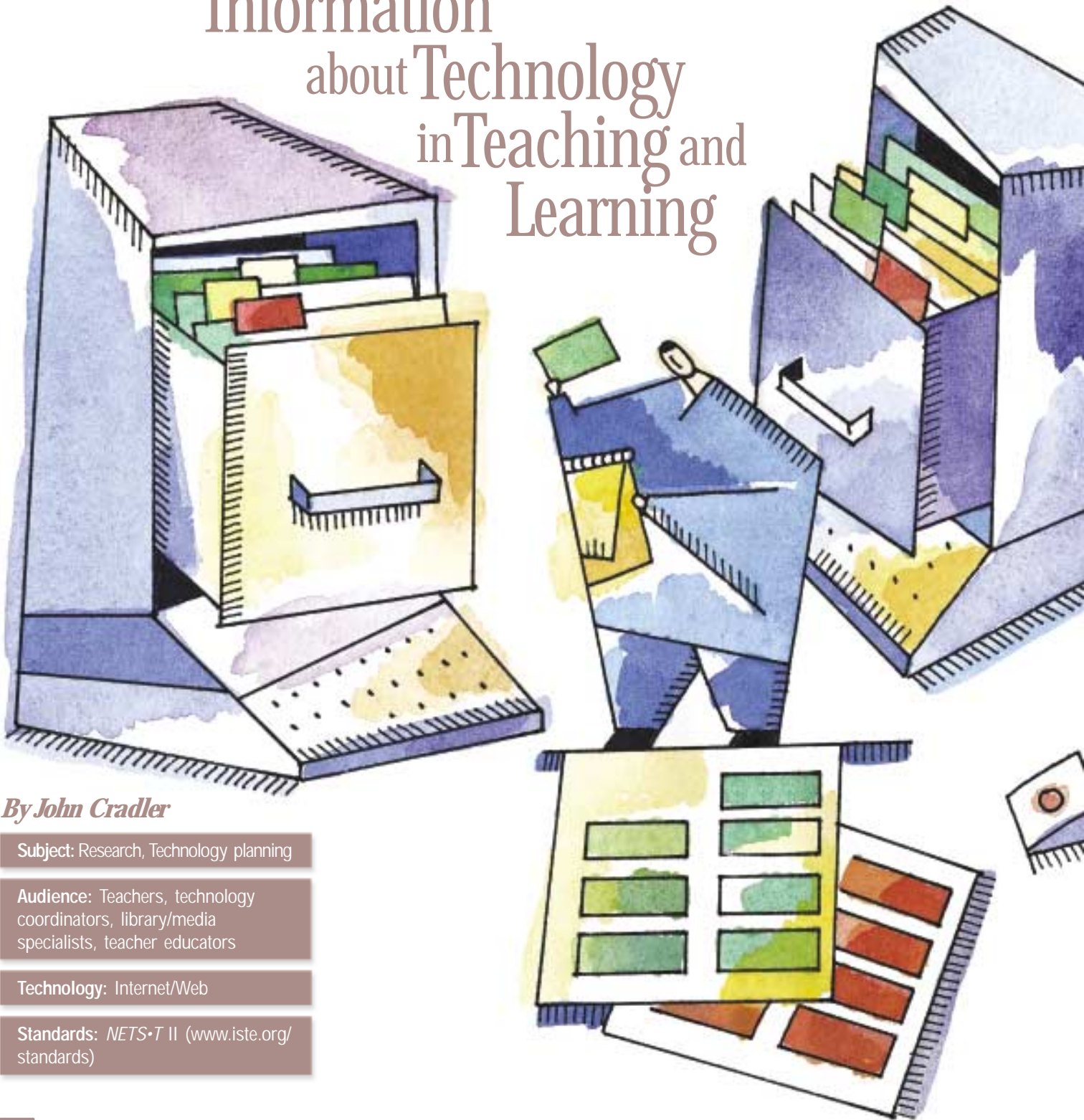


# Finding Research-Based Information about Technology in Teaching and Learning



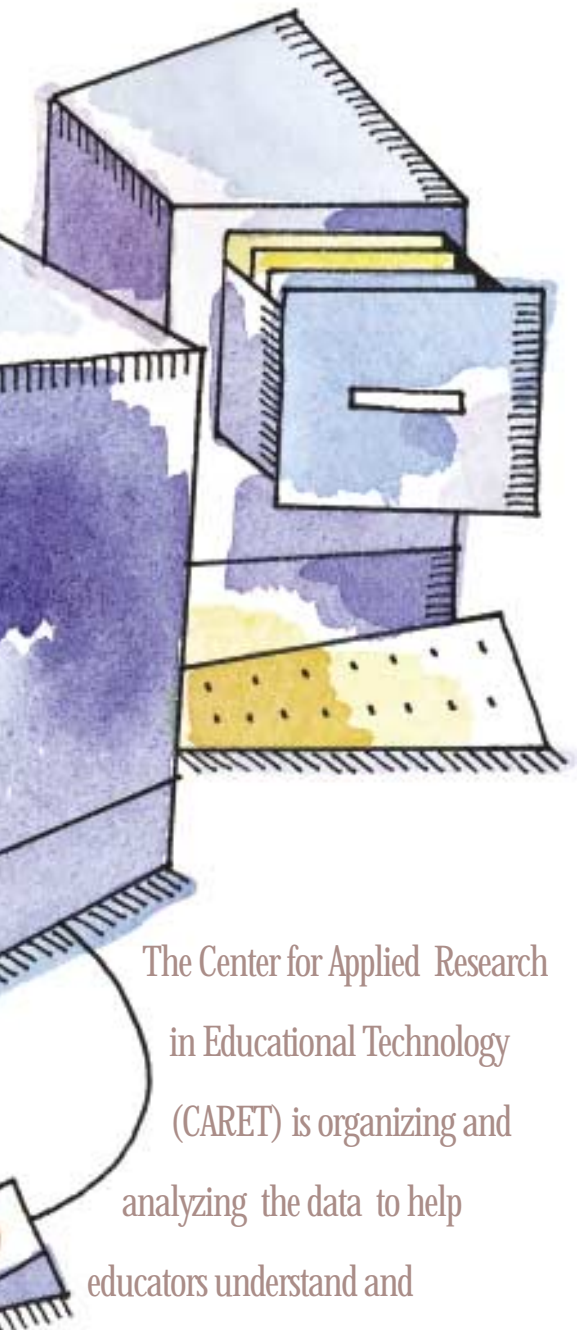
*By John Cradler*

**Subject:** Research, Technology planning

**Audience:** Teachers, technology coordinators, library/media specialists, teacher educators

**Technology:** Internet/Web

**Standards:** *NETS•T II* ([www.iste.org/standards](http://www.iste.org/standards))



The Center for Applied Research  
in Educational Technology  
(CARET) is organizing and  
analyzing the data to help  
educators understand and  
use the latest studies.

In 1988, Hank Becker (as cited in Bracy, 1988) commented that research evidence “does not come close to providing prescriptive data for deciding whether and how to use computers as adjuncts for instruction” (p. 30). Fourteen years of additional research has not produced simple answers to guide the use of educational technology. Teachers, administrators, school boards, and other educational decision makers face the fact that the path to effective technology use in classrooms is complex and dependent on numerous conditions.

To help educators find and use research to guide their way through this convoluted landscape, the International Society for Technology in Education (ISTE) and Educational Support Systems (ESS) of San Mateo, California, established the Center for Applied Research in Educational Technology (CARET) in April 2000 with a grant from the Bill & Melinda Gates Foundation. CARET is a dynamic Web site hosted by the Sacramento (California) County Office of Education, where educators can seek out what research says on critical and frequently asked questions in education. This article, the first in a series, introduces CARET and how to use its resources. Future articles will provide reviews of the findings and instructional implications of studies related to technology in teaching and learning.

### The Problem

Surveys of educators and policy makers have consistently shown that the need to be better informed about the most effective uses and impact of technology and telecommunications in education is critical and has become a priority of the U.S. Congress and of many state legislatures. CARET is intended to address this need by providing access to

research for planning, procurement, and implementation of technology in schools. CARET will also help determine areas needing further study in the field of technology.

Technology in schools is a rapidly increasing educational resource, with more than 75% of public school classrooms connected to the Internet and computer access in almost every classroom in the United States (National Center for Education Statistics, 2001). Teachers are consistently reporting an increased need for professional development to enable them to effectively use this resource to improve learning. They are also looking for research-backed curriculum and classroom practices that maximize student learning, and they need to know that the electronic learning resources they select for their classrooms are based on credible research and evaluation studies.

Administrators are in need of credible information to inform technology-use planning and purchasing decisions. Policy makers and school board members need to understand the extent to which technology contributes to student learning in relation to local, state, and national curriculum standards. The superintendents and politicians who propose and fund school budgets need credible research and evaluation findings to justify sustaining and expanding funding for technology in education. Software publishers need research to guide the development of applications that make optimal use of the technology available to schools. Finally, the emergence of new technologies and increased Internet bandwidth are increasing the demand for research on the types of applications that can take advantage of new and emerging information resources.

A one-stop source of information that provides on-demand and credible

# How to Use the CARET Web Site

*By Talbot Bielefeldt*

Let's say school technology coordinators need research to back up grant proposals. They might begin a CARET quest by clicking on the Questions & Answers button available at the left side of all CARET screens (Figure 1). That brings up a list of question topics (Figure 2). Users could also search for particular studies by topic, types of research, grade level, or other attributes.



Clicking on a topic (in this case, Student Learning) brings up a list of specific questions (Figure 3). Clicking on a question (in this case, "How can technology influence student academic performance?") brings up a bulleted list of answers. The technology coordinators decide that technology "integrated into the typical instructional day" is what they are striving for, so they click on that answer (Figure 4).



This brings up a short literature summary of evidence to back up the answer (Figure 5). Depending on the requirements for the grant application, this may be as far as the technology coordinators need to go. On the other hand, they may need to find out more about the quality of the evidence. To do that, they can click on highlighted citations in the reference list (Figure 6) to go to detailed reviews of selected studies.



The review section (Figure 7) of the site discusses implications and limitations of the study to give educators a better idea of how to use specific research in making decisions.



From any screen on the CARET Web site, a user can click the Contact Us button to e-mail CARET staff. Users can ask new questions, point out new or different studies that should be considered, or suggest new site features. In this way, the CARET site is constantly responding to user needs and to emerging research.



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research-based answers to a wide range of questions about technology in teaching and learning would help fill these needs. It would allow the application of research to practice that will result in the most effective use of technology. Many relevant studies exist, but they are not found in one place and must be carefully analyzed to determine the answer to specific questions of current interest. Most practicing educators and

decision makers do not have the time and resources to conduct their own analysis of these studies. As a result, they often make decisions about technology that rely on opinions or very limited study.

### The CARET Solution

Recognizing this need for a one-stop information resource, the Bill & Melinda Gates Foundation provided a grant to

establish an online resource designed to help educators and administrators make critical decisions about the use of technology in teaching and learning. "As teachers and schools are becoming increasingly dependent on technology, CARET will provide a much needed resource for educators," says Tom Vander Ark, executive director of education at the foundation (Bill & Melinda Gates Foundation, 2000).

CARET is intended to make it easy to locate the best research available to support educational technology planning from the classroom to the state levels. It provides easy access to practical educational implications of research, program evaluations, and related articles. Studies are reviewed using a comprehensive rubric designed to extract findings relevant to K–12 educators and policy makers. The CARET Web site allows users to select from commonly asked questions or to submit their own questions and then obtain answers based on the latest available studies.

### The CARET Process

The CARET process for relating research to educational decisions has two key components: a set of critical questions for educational technology and a set of evaluation criteria for research studies. The list of critical questions had its seed in a previous project of the Bill & Melinda Gates Foundation, an overview of research in educational technology authored by Jeff Fouts (2000) of Seattle Pacific University. To Fouts' list of critical questions, ISTE and ESS added additional questions that arose out of the organizations' extensive work in educational program evaluation.

The current list includes questions under nine main topics:

- Student learning
- Curriculum and instruction
- Instructional context
- Online teaching and learning
- Administration and leadership
- Professional development
- Instructional reform
- Policy implications
- Assessment and evaluation

The CARET project staff, with input from a national advisory committee, has established a set of evaluation

criteria for studies of educational technology. The criteria, available online, address methodology and applicability and are designed to help educators understand the strengths and limitations of a study as evidence to support decisions. The process for relating research to questions involves the following steps:

1. CARET staff dig through the research literature to identify possible studies to address each question. This stage involves searches of ERIC and other databases, browsing academic journals, and recommendations from the CARET advisory committee.
2. Prospective studies are read and critiqued in terms of the CARET criteria.
3. Selected studies are used to prepare answers to specific questions, along with literature summaries of the evidence for each answer. This is a collaborative process. One writer circulates a proposed answer and drafts a literature summary. Other CARET staff, who may be working on related questions, contribute suggestions, additional research citations, or even complete rewrites. One challenge at this stage is making sure answers focus on practical suggestions and are couched in terms relevant to practicing educators. When consensus is reached on an answer, it is posted to the Web site.
4. Key studies supporting each answer are reviewed in detail according to the CARET criteria, and reviews are posted to the Web site. On the site, readers of a literature summary can link to reviews of key studies, and readers of a review can link to critical questions the study relates to.
5. CARET users, as they access the site, submit new questions for CARET to address, new studies to review, and other suggestions for improvements.

These changes are incorporated into the set of questions and the literature to be read, and the process continues.

CARET provides a fluid process that is subject to change according to the needs of users. We hope CARET encourages practitioners to use research-based knowledge in their decision making and helps researchers and research funders target their efforts on key areas in which educators most need information. Next month's Research Windows article by John Cradler, Mary McNabb, Molly Freeman, and Richard Burchett focuses on one of the most critical of these areas—technology and student learning.

### Resource

CARET: <http://caret.iste.org>

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What research have you used to support your teaching? Or to argue for more technology funding in your school or district? How can you see using CARET? Send a letter to L&L editor, Kate Conley, at [letters@iste.org](mailto:letters@iste.org).