Reviews of Collections of Programs, Curricula, Practices, Policies, and Tools: Evaluated According to Evidence

Compiled by Judy Smith-Davis, Ph.D.

For more information, see: http://nirn.fpg.unc.edu/resources/reviews

This collection originated as part of the Results for Kids: Resources library of The IDEA Partnership, which transferred early contents to NIRN in 2009.

Software and Technologies for Instruction

A Systematic Review of the Use of Information and Communication Technologies (ICTs) in Developing Pupil's Understanding of Algebraic Ideas

Evidence for Policy and Practice Information (EPPI Center), Social Science Research Unit, Institute of Education, University of London. (2008). M. Goulding & C. Kyriacou.

This review addresses this question: "How have different information and communication technologies (ICTs) contributed to the development of understanding of algebraic functions for pupils up to the age of 16? . . . Identifying relevant studies involved carrying out an electronic search, using keywords with bibliographic databases, and hand-searching conference proceedings, citations, and publications recommended by contacts. . . . The research review resulted in 33 studies being identified for the systematic map and 14 for in-depth review." Findings and implications for instruction are discussed.

Overview and click at the left for full text -- The Use of ICTs in Developing Algebraic Ideas

Also see -- A Systematic Review of the Impact of Networked ICT on 5-16 Year Olds' Literacy in English

Accessible Instructional Materials: An Annotated List of Research Articles

National Center on Accessible Instructional Materials at CAST Inc, Wakefield, Massachusetts. (Continuing Collection).

"Articles listed in this resource focus on the following categories: (a) audio, (b) digital, (c) large print, (d) Braille, (e) assistive technology, (f) multimedia formats, (g) supported reading (such as text-to-speech), and (h) UDL. The articles include a mix of quantitative evidence, qualitative evidence, scholarly reviews, and expert opinion."

To review all Accessible Instructional Materials

Assistive Technology and Emergent Literacy for Preschoolers: A Literature Review

Assistive Technology Outcomes and Benefits. (2008). K. K. Floyd, L. L. S. Canter, & S. A. Judge.

The purposes of this review were to "(a) conduct a literature review of scholarly publications (within the last five years) in the area of assistive technology (AT) that focus on emergent literacy for preschoolers; (b) discuss the outcomes and benefits of AT; and (c) describe implications for future research. . . . The examination of the literature was conducted by applying four procedures: search procedures; inclusion criteria; relevance; and completion of article analysis form per each article reviewed. . . . This review generated the need for (a) more empirical research in the area of AT, emergent literacy, and early childhood; (b) shared professional perspectives regarding the conceptualization of emergent literacy, technology and AT in early childhood education; (c) increased collaboration, communication and investment of time and resources among key stakeholders regarding AT and its role in emergent literacy for young children; and (d) heightened recognition of the sociocultural influences affecting technology and AT integration in early childhood emergent literacy programs and activities."

Full text -- Assistive Technology and Emergent Literacy for Preschoolers
[Click the next to last item]

Cognitive Function and Assistive Technology for Cognition: A Systematic Review

Journal of the International Neuropsychological Society. (2012). A. Gillespie, C. Best, & B. O'Neill.

"The relationship between assistive technology for cognition (ATC) and cognitive function was examined using a systematic review. A literature search identified 89 publications reporting 91 studies of an ATC intervention in a clinical population. The World Health Organization's International Classification of Functioning, Disability and Health (ICF) was used to categorize the cognitive domains being assisted and the tasks being performed. Results show that ATC has been used to effectively support cognitive functions relating to attention, calculation, emotion, experience of self, higher level cognitive functions (planning and time management) and memory. The review makes three contributions: (a) It reviews existing ATC in terms of cognitive function, thus providing a framework for ATC prescription on the basis of a profile of cognitive deficits, (b) it introduces a new classification of ATC based on cognitive function, and (c) it identifies areas for future ATC research and development."

Abstract – Cognitive Function and Assistive Technology for Cognition
[Full text for purchase or rental]

Education Technology: Publications and Resources

What Works Clearinghouse (WWC), Institute of Education Sciences, U.S. Department of Education. (Continuing Collection)

"The WWC review of education technology interventions examines the evidence of the effectiveness of technology that facilitates learning. Items reviewed are intended to improve outcomes in: (a) mathematics achievement and (b) reading achievement. Grade/Age Range – All. Population – All." Current contents cover single study reviews and practice guides.

Access Education Technology Pubs and Resources

Effects of Educational Technology Applications on Reading Outcomes of Struggling Readers: A Best Evidence Synthesis

Best Evidence Encyclopedia, Johns Hopkins University, Baltimore, Maryland. (2012). A. Cheung & R. E. Slavin.

"This review examines the effectiveness of educational technology applications in improving the reading achievement of struggling readers in elementary schools. The review applies consistent inclusion standards to focus on studies that met high methodological standards. A total of 20 studies based on about 7,000 students in grades K–6 were included in the final analysis. Four major categories of education technology are reviewed: (a) small-group integrated applications, such as the Lindamood Phoneme Sequence Program and Read, Write, and Type; (b) comprehensive models, including READ 180 and Read About; (c) supplemental CAI programs, such as Destination Reading, Plato Focus, Waterford, and WICAT; and the Fast ForWord program."

Full text – Effects of Educational Technology Applications
[See the citation at the bottom of the page and click at the right for the full text]

Emerging Technologies in Adult Literacy and Language Education

National Institute for Literacy, Washington DC. (2010). M. Warschauer & M-L Liaw.

"This paper describes the potential contribution of emerging technologies to adult literacy and language education and the opportunities and challenges involved in incorporating these technologies into adult education programs. Various emerging technologies (those arising or undergoing fundamental transformation in the last decade) are described, ranging from audio and video production to games, wikis and blogs, to mobile devices, cell phones, and open-source software. Relevant research is reviewed, and the costs, difficulties and advantages of deploying various technological approaches in adult education are discussed. Although current research is insufficient to urge wholesale adoptions of the technologies described, many -- especially low-cost mobile devices -- warrant further investigation as potentially valuable tools for adult educators and learners."

Full text -- Emerging Technologies

Identifying Evidence-Based, Promising and Emerging Practices That Use Screen-Based and Calculator Technology to Teach Mathematics in Grades K-12: A Research Synthesis

Paper presented at the 2006 Annual Meeting of the American Educational Research Association by the Center for Implementing Technology in Education (CITEd), American Institutes for Research.
F. K. I. Helsel, J. H. Hitchcock, G. Miller, A. Malinow, & E. Murray.

"CITEd staff identified, reviewed, and summarized available evidence about educational technology practices (ETPs) for students with diverse learning needs. The synthesis focuses on mathematics instruction in grades K-8 that used screen-based technology and grades K-12 for calculators. To develop the synthesis, CITEd staff designed a framework, coding tools, and synthesis scheme; conducted a literature search; coded studies that met review parameters; summarized practices as evidence-based, promising, or emerging depending on the evidence available to support their use; and, determined how the practices reviewed related to the National Council of Teachers of Mathematics (NCTM) content standards. . . . CITEd's synthesis work in the areas of K-8 screen-based technologies and K-12 calculators indicates that there are relatively few studies that reflect evidence-based practices and that relatively few research studies exist to test the effects of any particular ETP. Synthesis findings are discussed in terms of needed research for ETPs."

Full text – Screen-Based and Calculator Technology to Teach Math

Improving Basic Mathematics Instruction: Promising Technology Resources for Students with Special Needs

Technology in Action, Technology and Media Division, Council for Exceptional Children. (2007).
B. Murray, H. Silver-Pacuilla, & F. I. Helsel.
Distributed by the Center for Implementing Technology in Education (CITEd).

This monograph "is a synthesis of the work completed by the CITEd research team in the use of technology to support mathematics instruction for students with special needs. Here, the emphasis is on practical classroom activities and tools in the areas of computational fluency, conceptual understanding, and problem solving. . . . Few students have isolated math disabilities. Most also have concomitant issues related to language processing and reading challenges. For example, many children with dyslexia have the same difficulty recognizing a math basic problem as they do a written word. That these problems are presented left to right (3 + 1 = 4) as well as top to bottom only adds to the difficulty. Students with language disorders often have difficulty in math because they must process the language before they can process the math problem. The use of inconsistent language (sum, add, total, plus, etc.) to describe the same operation can present additional challenges. Researchers have identified several practices that are effective in teaching mathematics to students with a range of learning needs."

Full text -- Improving Basic Mathematics Instruction

K-8 Screen-Based Technology to Support Mathematics: Literature Review

Center for Implementing Technology in Education (CITEd), American Institutes for Research, Washington DC. (Circa 2005).

"Screen-based technologies (i.e., those technologies that are presented on a computer screen) have evolved rapidly over the past two decades. Research on these evolving technologies is quite robust, but few screen-based educational technology practices have a research base sufficient to call them evidence-based. Additionally, although technology is generally thought of as particularly helpful for students with disabilities, technology rarely aligns with the needs of students with disabilities or is used for motivational rather than academic purposes. . . . CITEd's review and synthesis of research in K-8 screen-based technology revealed seven educational technology practices: (a) multimedia embedded supports; (b) games/drill and practice; (c) screen-based manipulatives; (d) cooperative learning; (e) enhanced anchored instruction; (f) computer-based feedback; and (g) web-based activities."

Full text -- K-8 Screen-Based Technology to Support Mathematics

Also see – K-12 Calculator Technology

Media and Attention, Cognition, and School Achievement

The Future of Children. (2008). The Woodrow Wilson School of Public and International Affairs at Princeton University & The Brookings Institution. M. E. Schmidt & E. A. Vandewater.

The authors "examine empirical evidence regarding the links between television and other electronic media, on the one hand, and learning and cognitive development in children and adolescents, on the other. (They) review research findings, in turn, on (a) achievement, language and symbol systems, (b) visual and spatial skills, (c) problem-solving skills, (d) attention, and, finally, (e) hypertext. Some areas have generated a fair amount of theory and research; others, very little. Interestingly, evidence that contradicts or supports existing assumptions has often had little effect on proclamations, policy, and punditry on this topic. Everyone, it seems, has an opinion about how electronic media influence children's learning. (The authors') goal is to summarize what is known — and what is not — about how these media shape adolescents' cognitive development, as well as to identify those areas in urgent need of additional empirical research."

Full text -- Media and Attention, Cognition, and School Achievement

Multimedia Technologies: Literature Review

Center for Implementing Technology in Education (CITEd), American Institutes for Research, Washington DC. (Circa 2007).

"Multimedia materials and learning environments can minimally be considered the combination of print and images, but commonly involve streaming video, music, instant messaging, or interactive online features. These applications are becoming more mainstream as computers and Internet connections are upgraded in schools, libraries and homes. CITEd reviewed the literature on the teaching and learning

potential of these materials and environments in a variety of contexts and content areas." The review is organized into 11 subtopics, each with a short practitioner-friendly article and links to the supporting research literature.

Full text -- Multimedia Technologies

Online K-12 Schooling in the U.S: Uncertain Private Ventures in Need of Public Regulation

National Education Policy Center, University of Colorado, Boulder. (2011).
G. V. Glass, K. G. Welner, & J. Bathon.

"Virtual education presents policy challenges to governments at all levels, from local school boards to the federal government. However, the challenges are particularly acute for states, because states bear responsibility for sanctioning and chartering online providers. Therefore, this policy brief is accompanied by model statutory code language to address the issues raised by research and discussed in the main body of this brief. . . . The brief has four goals: (a) to describe the current status of online (computer mediated) schooling in America; (b) to synthesize major research findings on the effectiveness of online instruction; (c) to analyze and discuss the political and economic forces shaping the movement toward increased use of online education at the K-12 level; and (d) to offer recommendations based on the findings. . . . The brief focuses on privately owned and operated virtual schools, most often taking the form of charter schools. That is, the focus is on publicly funded private ventures, and this combination of public and private interests raises significant and timely questions about the need for regulatory guidance."

Full text – Online K-12 Schooling in the U.S.

Online Learning: Does It Help Low-Income and Underprepared Students?
(pertains to postsecondary education)

Community College Research Center, Teachers College, Columbia University, New York City. (2011).
S. S. Jaggars.

“Online learning has generated much enthusiasm for its potential to promote greater access to college by reducing the cost and time of commuting and, in the case of asynchronous approaches, by allowing students to study on a schedule that is optimal for them. The enthusiasm surrounding these and other innovative, technology-based programs has led educators to ask whether the continuing expansion of online learning could be leveraged to increase the academic access, progression, and success of low-income and underprepared college students. However, this review of the postsecondary literature on online learning strongly suggests that online coursework -- at least as currently and typically implemented -- may hinder progression for low-income and underprepared students. The paper (a) explores why students might struggle in these courses, (b) discusses current access barriers to online education, and (c) offers suggestions on how public policy and institutional practice could be changed to allow online learning to better meet its potential in terms of improving both college access and student progression.”

Full text – Online Learning

Review of Research on Media Literacy and Young Children's Literacy: A Report to the Ready to Learn Initiative

Center for Children and Technology, Education Development Center Inc, New York City. (2007).
S. Pasnik & S. Strother.

The authors reviewed "research that has investigated the media's effects on young children's prereading and reading skills. This report is the result of those efforts. . . . Among the report's findings, a key insight from the review is that interventions using different media show effects on literacy, but the effects are not the same across studies. Positive effects were found for interventions that used television, computers, and talking books as media of instruction. At the same time, there were examples of interventions in each of these categories in which children did not show greater improvement than children in comparison groups. . . . .The effects of media synergy were small but significant in several literacy domains, and they were evident in studies where television was coupled with print curriculum implemented by teachers in preschools or day care centers." Additional findings are described. The Ready to Learn initiative is funded by the U.S. Department of Education.

Overview: Review of Research on Media Literacy and Young Children

Searching for the Reality of Virtual Schools

Center for Public Education, National School Boards Association, Alexandria, Virginia. (2012).
P. Barth, J. Hull, & R. St. Andrie.

This report "describes various ways digital learning is offered to students, from individual online courses to full-time virtual schools. In addition, (the authors) examine current state and district policies that govern its administration, including funding and accountability; and (they) discuss what is known -- and more importantly, what is *not* known -- about the effect of online learning on student outcomes. (They) conclude with a list of questions for state and local policymakers to ask when considering policies to expand online learning. . . . (The authors) found little solid research on the impact of online courses or schools. Interestingly, news organizations, rather than education researchers, seem to be taking the lead in investigating and reporting their effects. While (the authors) found a few examples of online learning having a positive effect, most of what they were able to uncover is not encouraging."

Summary – Searching for the Reality of Virtual Schools
[Click at the right for the full text, references, and other information]

Supporting Struggling Writers Using Technology: Evidence-Based Instruction and Decision-Making

Special Education Assistive Technology (SEAT) Center, Illinois State University. (2007).
G. R. Peterson-Karlan & H. P. Parette.
Distributed by the Center for Technology in Education (CITEd).

"This report uses research-based findings to examine the effectiveness of technology in supporting writing by students with learning disabilities (LD) and academic disabilities. . . . Multiple searches were completed using the ERIC-OVID and PsycINFO electronic databases. . . . In addition, a hand search was conducted of 15 journals known to publish articles on the topic. . . . The resulting database contained more than 200 articles, including discussion articles, meta-analyses, research articles, and national reports. Only articles reporting research were used in the analysis of technology effectiveness. . . . (Although) more research is needed to establish a complete evidence base for many of the more promising tools, the evidence available most strongly supports the following practices: (a) planning and organization technologies, including outlining tools and draft templates, especially those that are genre specific and also have embedded content prompts and procedural facilitation cues; (b) transcription technologies, including both word processing (keyboarding) and word prediction; and (c) spell checkers, especially with text-to-speech output, as an editing technology."

Full text -- Supporting Struggling Writers Using Technology
[Scroll down and click under Research Papers – and see other resources on this page]

TechMatrix (an online database)

National Center for Technology Innovation (NCTI), American Institutes for Research, Washington DC. (Ongoing Collection).

"The TechMatrix is a powerful, free online database to help educators and families find educational and assistive technology resources and help for students with special needs. Resources include (a) 300 reviewed technology products in the areas of reading, writing, mathematics, science, and assistive technology; (b) 70 Ask the Expert answers to questions; (c) 70 Info Briefs written for practitioners and parents; (d) 250 research citations on technology implementation and evaluation studies; and (e) 50 related websites and web tools."

Search the TechMatrix

Technology and Teaching Children to Read

Northeast and the Islands Regional Technology in Education Consortium, a collaboration of Education Development Center, Inc (EDC); TERC in Cambridge, Massachusetts: the Education Alliance at Brown University; & Learning Innovations at WestEd. (2004),
D. Sherman with G. Kleiman & K. Peterson.
Distributed by the Education Resources Information Center (ERIC).

"This report is intended to provide background information that will help reading specialists, education technology specialists, classroom teachers, and special education teachers work together to understand, evaluate, and implement effective uses of technology within K-6 reading programs. It brings together the research-based guidelines for teaching children to read from the National Reading Panel report (NRP, 2000) with information about the potential uses of multimedia digital technology to enhance reading instruction. It provides background about effective reading instruction and potential uses of technology, and summarizes the currently available research evidence on ways in which technology can

successfully enhance reading instruction in the elementary grades." The report includes five questions that technology and reading specialists might want to consider in preparation for making decisions about technology in reading instruction.

Full text – Technology and Teaching Children to Read

Technology to Support Writing by Students with Learning and Academic Difficulties: Recent Research Trends and Findings

Assistive Technology Outcomes and Benefits. (2011). G. R. Peterson-Karlan.

The trends and findings from a descriptive analysis of 25 years of research studies examining the effectiveness of technology to support the compositional writing of students with learning and academic disabilities are presented. A corpus of 85 applied research studies of writing technology effectiveness was identified from among 249 items in the scholarly literature. The use of technologies to support each of the components of the writing process is reported in terms of the research designs used, the writing processes supported, and the historical trends in research publication. The research designs represented in the research base suggests that, overall, there is a developed program of research; however, this does not hold for the individual writing process areas (planning, transcription, editing, and revising). Among the four process areas, the largest number of studies is of technologies to support transcription with revising the next most frequent and few studies of planning/organization and editing."

Full text – Technology to Support Writing
[Click on the last title]

Text Messaging and Teenagers: A Review of the Literature

Journal of the Research Center for Educational Technology. (2011). S. Porath.

"Most teenagers in America are nearly inseparable from their cell phones, not because they are constantly talking, but because they are connecting with their friends through text messaging. Although cell phones are banned in most K-12 schools, students are text messaging constantly there as well. Few adults, including teachers and administrators, understand how and why adolescents and young adults are using text messaging or how to harness text messaging capabilities in the classroom. This literature review examines the limited amount of research on the practice of text messaging for adolescents and young adults (ages 11-21), focusing on the motivation, means, and methods of text messaging. In addition, it considers how adults have successfully engaged text messaging to assess and inform youth about health-related issues. In this light, some current educational uses of text messaging are highlighted, along with implications for future research."

Full text – Text Messaging and Teenagers

The Effect of Computers on Student Writing: A Meta-Analysis of Studies from 1992 To 2002

Journal of Technology, Learning, & Assessment. (2003). A. Goldberg. M. Russell, & A. Cook.

"Meta-analyses were performed including 26 studies conducted between 1992–2002 focused on the comparison between K–12 students writing with computers vs. paper-and-pencil. Significant mean effect sizes in favor of computers were found for quantity of writing (d=.50, n=14) and quality of writing (d= .41, n=15). Studies focused on revision behaviors between these two writing conditions (n=6) revealed mixed results. . . . For educational leaders questioning whether computers should be used to help students develop writing skills, the results of the meta-analyses suggest that, on average, students who use computers when learning to write are not only more engaged and motivated in their writing, but they produce written work that is of greater length and higher quality."

Full text -- The Effect of Computers on Student Writing: A Meta-Analysis of Studies from 1992 To 2002

The Effect of ICT Teaching Activities on Science Lessons on Students' Understanding of Science Ideas (ICT = Information and Communication Technology)

Evidence for Policy and Practice Information (EPPI Centre), Social Science Research Unit, Institute of Education, University of London. (2006).
S. Hogarth, J. Bennett, F. Lubben, B. Campbell, & A. Robinson.

For this study, "557 scientific papers on the use of ICT in science lessons, published in English in the period 2000–2005 were screened. These were narrowed down to 37 studies from 10 countries that focused on ICT and scientific ideas. As the most frequent type of ICT used was simulations (53%), the in-depth review question was: What evidence is there from controlled trials of the effects of simulations on the understanding of science ideas demonstrated by students aged 11-16? . . . There were nine evaluation studies on the use of simulation to teach the understanding of science ideas that included a control and pre and post testing of achievement in the in-depth review. Seven of these were rated medium high or medium quality studies. Simulations fell into two main categories: (a) simulation of specific experiments and (b) simulations of a wider scientific situation, commonly known as virtual environments, which could include experimental simulations. Both types of simulation can improve students' understanding compared to non-ICT/traditional teaching and learning activities. (Other findings include the following). Students' use of ICT simulations helped them to improve their understanding of science ideas more effectively compared to the use of non-ICT teaching activities. Students' use of ICT simulations was more effective than using non-ICT teaching activities for improving basic science ideas including science understanding and the scientific approach. However the improvement of higher levels of understanding (for example, the transfer of scientific knowledge from one situation to another and experimental design) can equally well be achieved when students use traditional (non-ICT) teaching approaches. The gains in students' learning when using ICT simulations were further enhanced when teachers actively scaffolded or guided students through the ICT simulations."

Overview -- The Effect of ICT Teaching Activities on Science Lessons on Students' Understanding of Science Ideas

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The Effectiveness of Education Technology Applications for Enhancing Reading Achievement in K-12: A Meta-Analysis

Best Evidence Encyclopedia, Johns Hopkins University, Baltimore, Maryland. (2012).
A. Cheung & R. E. Slavin.

"This review examines research on the effects of technology use on reading achievement in K-12 classrooms. It applies consistent inclusion standards to focus on studies that met high methodological standards. In addition, methodological and substantive features of the studies are investigated to examine the relationship between education technology and study features. A total of 85 qualified studies based on over 60,000 K-12 participants were included in the final analysis." Four major categories of education technology are reviewed: (a) computer-managed learning; (b) innovative technology applications; (c) comprehensive models; and (d) supplementary technology.

Full text – The Effectiveness of Education Technology Applications for Enhancing Reading Achievement
[See the citation at the bottom of the page and click at the right for the full report]

Also see – The Effectiveness of Educational Technology Applications for Enhancing Mathematics Achievement in K-12 Classrooms: A Meta-Analysis

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The Effects of Technology-Based Interventions on Academic Outcomes for Youth with Disabilities

National Post-School Outcomes Center, University of Oregon, Eugene. (2006)
J. J. Dugan, R. B. Cobb, & M. Alwell.

"The relationship between technology-based interventions and academic performance for secondary aged youth with disabilities was explored in this systematic review. A total of 39 studies intervening with 1,491 youth with behavioral disorders, emotional disorders, learning disabilities, and moderate and severe disabilities were included. These studies matched the intervention, outcome, and sampling selection criteria for the review, and met minimally acceptable standards of internal and external validity for research design and methodology. The findings of this review strongly support the efficacy of technology-based interventions across treatment types, educational settings, and disability categories in the improvement of academic achievement. Detailed implications for special education practice in secondary school environments are presented, rival explanations for the findings are examined, and future research topics are suggested."

Full text – The Effects of Technology-Based Interventions
[Scroll down]

Understanding the Implications of Online Learning for Educational Productivity

Office of Educational Technology, U.S. Department of Education. (2012).
Prepared by the Center for Technology in Learning, SRI International.
M. Bakia, L. Shear, Y. Toyama, & A. Lasseter.

"The purpose of this report is to support educational administrators and policymakers in becoming informed consumers of information about online learning and its potential impact on educational productivity. . . . Given the limitations of the research regarding the costs and effects of online instruction for secondary students, the review also draws on examples and research about the use of online learning for postsecondary instruction. While there are many differences between higher education and elementary and secondary education (e.g., age and maturity of students), postsecondary institutions have a broader and longer history with online learning than elementary and secondary schools. The intention is to use the literature from higher education to illustrate concepts that may apply to emerging practices in elementary and secondary education."

Full text – Understanding the Implications of Online Learning

Universal Design for Learning Guidelines Version 2.0: Research Evidence (across 26 checkpoints)

National Center on Universal Design for Learning at CAST Inc, Wakefield, Massachusetts. (2011).

Universal Design for Learning is "a flexible approach to curriculum design that offers all learners full and equal opportunities to learn. . . . The UDL Guidelines (v1.0) are based on research from several very different fields and from diverse researchers at many different universities and research organizations. That research has been reviewed, compiled, and organized by educators and researchers at CAST. The process spanned a 10-year period and involved several different stages. . . . Nearly 1,000 articles were eventually reviewed and selected for inclusion in the evidence base that is now organized around each of the checkpoints in the UDL guidelines. Within each checkpoint, the supporting research is organized into two categories: (a) experimental and quantitative evidence, and (b) scholarly reviews and expert opinions." The UDL Guidelines cover instructional alternatives, including technologies.

Full text -- UDL for Learning Guidelines: Research Evidence

Using Technology to Support Struggling Students in Science

Center for Implementing Technology in Education (CITEd), American Institutes for Research, Washington DC. (2010). A. Brann, T. Gray, P. J. Piety, & H. Silver-Pacuilla.

"This report discusses how struggling students can be supported in science education and how accessible and assistive technologies can help. Following a background introduction to the topic and challenges, the report is organized into five sections, each addressing an important dimension of K–12

science education within the context of 21st century skills. Each section presents research findings and strategies to guide educators in implementing science education that is inclusive." These five sections are (a) Physically Doing Science or 'Getting a Mechanical Grip' on the Natural World; (b) Visualization, Representing, and Modeling; (c) Science Literacy, Vocabulary, and Discourse; (d) Questions, Argumentation, and Use of Evidence; and (e) Student Engagement and Identity with Science.

Full text – Using Technology to Support Struggling Students in Science
[Scroll down and click under Research Papers and see other resources on this page]