A Compendium of Education Technology Research Funded by NCER and NCSER: 2002-2014

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Disclaimer

The Institute of Education Sciences at the U.S. Department of Education contracted with Westat and Plus Alpha Research & Consulting (subcontractor) to develop a compendium that describes education technology research funded by its National Center for Education Research (NCER) and National Center for Special Education Research (NCSER) from 2002 through 2014. The views expressed in this report are those of the authors, and they do not necessarily represent the opinions and positions of the Institute of Education Sciences or the U.S. Department of Education.

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Disclosure of Potential Conflict of Interest

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Preamble from the Institute of Education Sciences

In 1999, the National Research Council published a report on the state of education research in the United States. The panel concluded,

> One striking fact is that the complex world of education—unlike defense, health care, or industrial production—does not rest on a strong research base. In no other field are personal experience and ideology so frequently relied on to make policy choices, and in no other field is the research base so inadequate and little used.
>
> National Research Council (1999, p. 1)

Three years later with the passage of the Education Sciences Reform Act of 2002, Congress established the Institute of Education Sciences (Institute) and charged it with supporting rigorous, scientifically valid research that is relevant to education practice and policy. To meet this charge, the Institute established long-term programs of research within the National Center for Education Research (NCER) and the National Center for Special Education Research (NCSER) that address topics of importance to education practitioners and leaders, specify methodological requirements for projects, and establish a scientific peer-review system for reviewing grant proposals.

Since the Institute's founding, NCER has funded a broad range of work targeted toward providing solutions to the education problems in our nation. NCSER became part of the Institute with the 2004 reauthorization of the Individuals with Disabilities Education Act (IDEA) that gave the primary authority for special education research within the U.S. Department of Education to the Institute (IDEA 2004). NCSER began operations in 2005 and funds a comprehensive program of special education research designed to expand the knowledge and understanding of infants, toddlers, and children with or at risk for disabilities. Both centers fund four general types of research: exploratory research that contributes to our core knowledge of education, development and piloting of education interventions (e.g., instructional interventions, policies, and technologies), evaluation of the impact of interventions, and development and validation of measurement instruments.

Compendia of Research Funded by the Institute

This compendium is part of a series of documents intended to summarize the research investments that NCER and NCSER are making to improve student education outcomes in specific topical areas. This compendium organizes and describes projects pertaining to education technology. Other compendia explore projects pertaining to math and science research and to social and behavioral research. The Institute provided the contractors with each project's structured abstract, which became the basis for the project's description in the compendium. It is the Institute's intent that this compendium assist education stakeholders in identifying projects of interest and getting an overview of major research goals and activities; it does not describe the research designs or summarize project findings. Detailed abstracts of all projects in this compendium are available on the Institute's website (http://ies.ed.gov/funding/grantsearch).

Executive Summary

Between 2002 and 2014, the Institute of Education Sciences (Institute) supported over 400 projects focused on education technology through the National Center for Education Research (NCER) and the National Center for Special Education Research (NCSER). The majority of this work has been funded through Education Technology research topics of NCER and NCSER and the Institute's Small Business Innovation Research (SBIR) program run by NCER. Both centers also support projects focusing on education technology through other research topic areas, including programs such as Cognition and Student Learning, Early Learning Programs and Policies, Math and Science, Reading and Writing, Social and Behavioral Context, Improving Education Systems, and Effective Teachers and Teaching. Together, researchers funded by NCER and NCSER have developed or studied more than 270 web-based tools, 85 virtual environments and interactive simulations, 95 intelligent tutor and artificial intelligence software systems, 50 game-based tools, and 105 computer-based assessments.

This compendium organizes information on the education technology projects sponsored by NCER and NCSER into three main sections: Technology to Support Student Learning (in which the target of the project was students themselves or their families), Technology to Support Teachers and Instructional Practice, and Technology to Support Research and School Improvement. Within each section, projects are sorted into chapters based on content area, grade level, and intended outcome. In determining the chapters, we considered the National Education Technology Plan (U.S. Department of Education, Office of Educational Technology 2010, 2016). Because projects may have multiple foci (e.g., supporting student learning and supporting teachers), some projects were assigned to multiple sections. (See Appendix A: Compendium Process for a discussion of the process used during the compendium's development.)

Each project included in this compendium is represented by a brief description that contains an overview of the major components of the project. Readers who would like more information about a project may follow the hyperlinked award number in each project description to access the Institute's online project page, which contains the full abstracts upon which the compendium's descriptions are based.

Technology to Support Student Learning

The Technology to Support Student Learning section includes 297 projects divided into 7 chapters based on the primary focus of the project. To help readers locate technologies directed to students with or at risk for disabilities, we have an additional chapter dedicated solely to assistive technology. The projects in this chapter may also appear in other chapters (e.g., math and science), depending on the project's focus. Figure ES-1 shows the distribution of projects within the Technology to Support Student Learning section. Because projects could be dual-coded in the assistive technology chapter and another chapter in either this section or in another section, the total number of projects in this section is 313.

Figure ES-1: Projects focused on Technology to Support Student Learning, by domain or key outcome (N = 313)

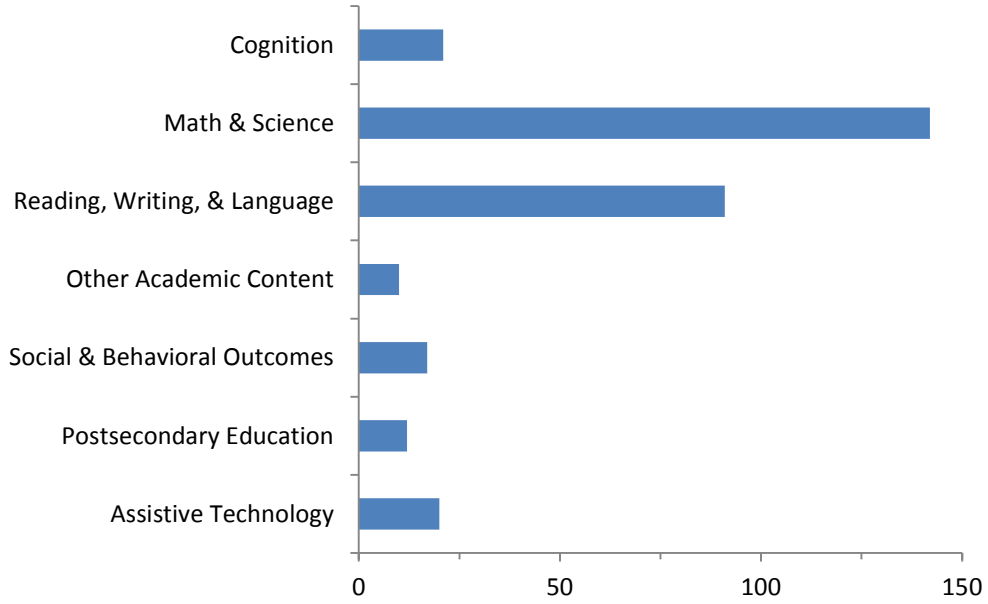

Figure Reads: Of the projects addressing Technology to Support Student Learning, 21 focused on cognition; 142 focused on math and science; 91 focused on reading, writing, and language development; 10 focused on other academic content areas; 17 focused on social and behavioral outcomes; 12 focused on postsecondary education; and 20 focused on assistive technology.

Note: Assistive technology projects could be categorized in multiple sections and chapters based on project focus. The total number of projects under Technology to Support Student Learning (N = 313) is, therefore, larger than the unique number of projects within the section (N = 297).

Technology to Support Teachers and Instructional Practice

There were 88 projects with a Technology to Support Teachers and Instructional Practice focus. These were sorted into two chapters based on the primary focus of the project: Educator Professional Development and Instructional Supports and Classsroom Management. Figure ES-2 shows the distribution of projects within this section.

Figure ES-2: Projects focused on Technology to Support Teachers and Instructional Practice, by domain or key outcome (N = 88)

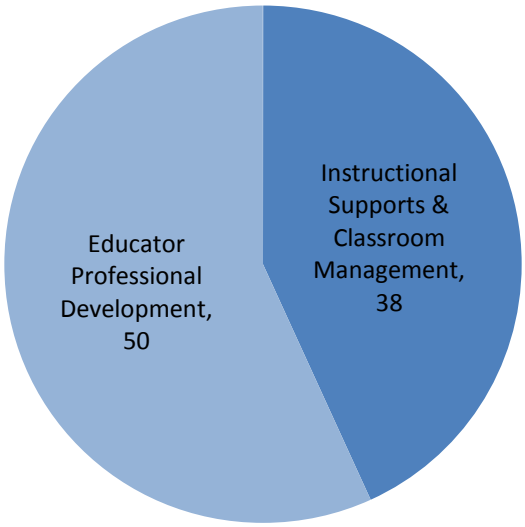

Figure Reads: Of the projects addressing Technology to Support Teachers and Instructional Practice, 38 focused on instructional supports and classroom management, and 50 focused on educator professional development.

Technology to Support Research and School Improvement

There were 32 projects with a Technology to Support Research and School Improvement focus. These were sorted into two chapters based on the primary focus of the project. Figure ES-3 shows the distribution of projects within this section.

Figure ES-3: Projects focused on Technology to Support Research and School Improvement, by domain or key outcome (N = 32)

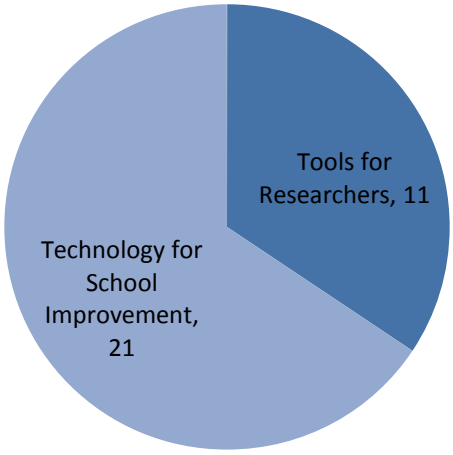

Figure Reads: Of the projects addressing Technology to Support Research and School Improvement, 11 focused on tools for researchers, and 21 focused on technology for school improvement.

Introduction

Why Education Technology Research?

Education technology offers the promise of enhanced personalization, access, and productivity (Kim, Copeland, and An 2015). It aims to improve student learning through a variety of paths: by engaging students in academic content matter, offering tools to help improve metacognitive and social strategies, and providing assistive technology to facilitate learning for all students. For example, technology has helped to engage and motivate students in specific academic content matter by providing game-like learning opportunities (Dede 2009; Gee 2004). It has offered easy-to-access information and opportunities for collaborative learning, which encourage improvement of student metacognitive and social strategies (Graesser 2013). Technology has also allowed the creation of learning environments that extend beyond the traditional classroom, offering opportunities for collaborative learning to students who are geographically disbursed (Brown and Adler 2008; Collins and Halverson 2009; National Science Foundation 2008). It has broadened our notion of student learning to extend beyond the formal learning space (e.g., classrooms and schools) to informal learning settings (Barron 2006; Warschauer et al. 2010). For example, the "flipped classroom" approach uses technology so that afterschool informal time is spent listening to and viewing lectures or lessons on computers or other devices while formal classroom time is spent on individualized instruction (Kong 2015). Technology enables learners to connect to online communities where they can share resources, work together, and gain access to a larger pool of expertise, mentors, and teachers (Ito 2009).

Education technologies also facilitate teacher instruction, such as differentiated or personalized instruction, and professional development. For example, social media content created by teachers–via blogs, podcasts, and YouTube videos (Jenkins 2009; Johnson, Levine, and Smith 2009; OECD 2006, 2008)–can help to enrich students' learning experiences and facilitate personalized instruction. A nationally representative study of more than 4,600 teachers (Bill and Melinda Gates Foundation 2014) found that 93 percent of the teachers regularly used some form of digital tool to guide instruction. Teachers indicated that they used technology to aid in the delivery of instruction, to help diagnose student learning challenges, to vary delivery methods, to tailor instruction to individual students, to aid collaborative and interactive learning experiences, and to help strengthen specific learning skills as needed.With this shift to technologically enhanced teaching, professional development has been a key requisite for successful use, integration, and implementation of technology in the classroom (Mousa and Barrett-Greenly 2015; Wijekumar, Meyer, and Lei 2013).

Education technologies also aim to support school leaders. For instance, new accounting systems bring together data from a wide range of systems and stakeholders, and this has greatly improved data-driven decisionmaking. As an example, the Strategic School Funding for Results (SSFR) project was designed to help districts implement more equitable strategies for allocating resources (Haxton et al. 2012), and it included the development of a computerized district- and school-level data

management system. Linking high-quality K-12 and higher education data can help districts, state education agencies, and higher education institutions to ensure that students are college ready (Lavesque 2015; Stephan et al. 2015). Technology has the potential to enhance the efficiency and effectiveness of school systems, leveraging data to improve educational outcomes for students.

Purpose of the Compendium

The purpose of this compendium is to catalog NCER's and NCSER's contributions to education technology research. It organizes and provides accessible information for practitioners, policymakers, and other education stakeholders on the breadth of education technology projects sponsored by the two research centers. These projects have different primary purposes, including exploration, development of interventions (practices and policies), evaluation of interventions, and development and validation of measurement tools. Research undertaken as part of these projects is contributing to a knowledge base that ultimately aims to improve academic outcomes for students.

This compendium is part of a series of compendia that highlight different areas of NCER- and NCSER-funded research. Other compendia explore social and behavioral research and math and science research.[1]

Compendium Process

NCER and NCSER identified 401 research projects funded from 2002 through 2014 for inclusion in this compendium. The projects feature education technologies for teaching, learning, and research. Projects were categorized across three sections: Technology to Support Student Learning (in which the target of the project was students themselves or their families), Technology to Support Teachers and Instructional Practice, and Technology to Support Research and School Improvement.

The contractors, external content advisors, and Institute staff worked together to identify chapters within the three sections and sort projects into sections and chapters. With input from the Institute, the contractor assigned each project to chapters based on key outcomes. To determine the assignments to chapters and prepare the project descriptions, the contractor used the structured abstracts provided by the Institute.[2] Projects were also tagged for specific focal populations and products.

For this compendium, projects with multiple foci (e.g., technology for student literacy and teacher professional development) could appear in more than one section, but typically only one chapter within a section. For example, if a project focused equally on student and teacher outcomes, it was assigned to both sections (e.g., Technology to Support Student Learning and Technology to Support Teachers and Instructional Practice). If, however, a project had a focus on student learning, such as

[1] See http://ies.ed.gov/ncer/pubs/20162002/ and http://ies.ed.gov/ncer/pubs/20162000/.
[2] http://ies.ed.gov/funding/grantsearch

a specific math or science technology (e.g., algebra tutor) as well as a focus on a more general concept (e.g., student motivation), it would be assigned to one chapter within the section depending on the primary focus of the project.[3] This was done to help minimize redundancy in the document. The exception was the Assistive Technology chapter, where projects could appear in both the Assistive Technology and in other chapters within the same section (as well as in other sections throughout the compendium). We made this exception for Assistive Technology to help readers interested primarily in students with or at risk for disabilities to locate specific technologies aimed to support these populations. For additional detail regarding the assignment of projects to sections and chapters, see Appendix A.

Stylistic Conventions

NCER and NCSER fund research under a goal structure that includes exploration, development of interventions (e.g., instructional interventions, policies, and technologies), evaluation, and development and validation of assessments. To orient readers and align project descriptions with these research goals, the contractor developed a set of common verbs and sentence stems associated with each goal. For example, exploration projects begin with sentence stems such as, "In this project, researchers explored the relationship between…" or "In this project, researchers explored how…" to help denote the project's goal. Authors used the past tense for all projects, including those that were ongoing at the time of the initial writing, to ensure consistency across the project descriptions as a whole. (See Appendix A: Compendium Process for a description of the stylistic conventions used in the compendium.)

Project Tables

Each chapter includes project descriptions that are displayed in a table format. These tables provide the project title and award number; the principal investigator and affiliation; a short project description; and indication of relevant grade levels, focal populations, and products (see Figure 1). Project tables are ordered by grade-level within each chapter. Projects without a grade level focus are at the beginning of each chapter. Within grade level, projects are further ordered by project award year, starting with projects funded in 2002 and ending with projects funded in 2014. Finally, within project award year, projects are sorted by the award number.

[3] Only one project deviated from this rule, ED07CO0039, which was deemed to focus equally on math and reading and was, hence, put in I.2 and I.3.

Figure 1. Sample compendium project table

Development of a Computerized Assessment of Executive Function for Preschool-Aged Children	
Award # R324A120033	Laura Kuhn, University of North Carolina, Chapel Hill
In this project, researchers designed and validated a computerized assessment of executive function (a set of cognitive processes that help individuals manage cognitive resources during goal-related activities) for use with prekindergarten-aged children. The assessment aimed to identify executive function deficits in diverse groups of children. The computer-based assessment displayed text on the screen that described the nature of the task and an item that interviewers read to children. Simultaneously, the assessment displayed test stimuli to children on the touchscreen monitor. Children responded to each item by touching the screen, and their response was recorded.	**Grade Levels:** EC **Focal Populations:** SWD **Technology Developed/Studied:** ✓

For example, the table shown in Figure 1 features a project wherein researchers designed and validated a computerized assessment of executive function for use with prekindergarten-aged children. The first row provides the project title. The second row provides the award number (a unique number used by the Institute to identify grants and contracts), the name of the principal investigator, and the institution that received the award. The third row provides a short project description (left column) and tags for grade level and focal population. Icons are also provided to help readers quickly identify the type of education technology in the project (right column). The award number is hyperlinked to the full abstract on the Institute website.

The following abbreviations and icons are used in the tables.

- Each table includes information about the grade range of students who are targeted by the technology or who are taught by those targeted by the intervention (e.g., elementary school teachers). Early Childhood (EC) includes settings up through prekindergarten; Elementary School (ES) includes kindergarten through grade 5; Middle School (MS) includes grades 6 through 8; High School (HS) includes grades 9 through 12; and Postsecondary and Adult Education (PA) includes settings for students who are over 16-years old, outside of the K-12 system, and participating in adult or postsecondary education. Blank cells indicate that grade ranges are not applicable (i.e., the technology is for researchers or school leaders) or that the information is unavailable.
- Practitioners and education leaders often seek guidance on English learners (ELs) and students with or at risk for disabilities (SWDs). If a project focused specifically on one or both of these

two student populations, it was coded accordingly. Blank cells indicate that the project did not focus on either of these specific groups.

- Each project was also coded to indicate whether it explored, developed, evaluated or validated one or more of the following technologies: web-based (spider web icon), virtual environment and/or interactive simulation (viewer icon), intelligent tutor and/or artificial intelligence (tutor icon), game-based (chess icon), and computer-based assessments (checkmark icon). Blank cells indicate that no products of those specific types were developed or studied as part of the project.

The project descriptions, which are necessarily short in order to follow the compendium's stylistic guidelines (see Appendix A, Project Descriptions), may not contain reference to all the elements denoted by the abbreviations and icons. Readers who wish to learn more about the projects (e.g., population sampled, publications stemming from the project) should refer to the online abstract, which is hyperlinked to the award number in the project description table.

Each chapter includes a table key to help guide readers, as shown below.

Table Key

Grade levels:

EC	Early Childhood	HS	High School
ES	Elementary School	PA	Postsecondary and Adult Education
MS	Middle School		

Focal populations:

EL	English Learners
SWD	Students With Disabilities

Products developed or studied:


The spider web icon denotes **web-based** technology developed or studied.


The viewer icon denotes **virtual environment / interactive simulation** developed or studied.


The tutor icon denotes **intelligent tutor / artificial intelligence** technology developed or studied.


The chess piece icon denotes **game-based** technology developed or studied.


The checkmark icon denotes an **assessment** developed, validated, or studied.

Index and Appendixes

This compendium includes an extensive index that identifies projects by keywords, specific phrases, and topics (e.g., project setting, subject areas). Each index entry includes the award number and the compendium page number on which the project description can be found.

Appendix A describes the process used to develop the compendium. Appendixes B, C, D, E, and F identify projects that developed or studied a web-based technology, virtual environment/interactive simulation technology, intelligent tutor/artificial intelligence technology, game-based technology, and computer-based assessment technology, respectively.

Section I: Technology to Support Student Learning

This section features 297 unique projects focused on Technology to Support Student Learning. Each chapter in this section represents a major research focus area. In choosing chapter topics or foci, we were informed by the research programs supported by the National Center for Education Research (NCER) and National Center for Special Education Research (NCSER).

Each chapter within this section introduces a major research focus (cognition, math and science, etc.) and then presents relevant projects in table format. The tables provide the project title and award number, the principal investigator and affiliation, a short project description with tags to indicate the grade level(s) on which the project focused, the project's focal population (i.e., English learners or students with or at risk for disabilities), and the types of education technology products developed or studied.

1. Cognition

This chapter includes Institute-funded research on technologies that support and improve student cognition. Cognition refers to mental processes through which an individual acquires knowledge or perceives and comprehends information. Institute-funded education technology projects in this area apply theories of how the mind acquires, processes, and uses information to education practices such as study strategies (e.g., the timing and ordering of studying, the type of practice), instructional approaches (e.g., optimal ways to present information, the role of feedback and error correction), curricula (e.g., the type and order of content presented, optimal activities and assignments), and assessment (e.g., the optimal format for questions). Education technologies have the potential to build students' problem-solving and metacognitive skills (i.e., the ability to reflect on one's cognitive processes); improve students' ability to self-regulate their learning (e.g., knowing when to restudy or which strategies to use while studying); keep students on task; and individualize instruction through scaffolding. These areas have been addressed through Institute-funded research (e.g., Biswas, Segedy, and Kinnebrew 2013; Roll, et al. 2010; Mettler, Massey, and Kellman 2011; Jackson, et al. 2015) and in the broader field (e.g., Bennett et al. 2007; Hannafin, Hannafin, and Grabbitas 2009; Kong 2015; Lazakidou and Retalis 2010).

Table Key

Grade levels:

EC	Early Childhood	HS	High School
ES	Elementary School	PA	Postsecondary and Adult Education
MS	Middle School		

Focal populations:

EL	English Learners
SWD	Students With Disabilities

Products developed or studied:


The spider web icon denotes **web-based** technology developed or studied.


The viewer icon denotes **virtual environment / interactive simulation** developed or studied.


The tutor icon denotes **intelligent tutor / artificial intelligence** technology developed or studied.


The chess piece icon denotes **game-based** technology developed or studied.


The checkmark icon denotes an **assessment** developed, validated, or studied.

For more information about these projects and publications stemming from them, please follow the hyperlinked award number to the online abstract on the Institute's website.

Computer Adaptive Triarchic Assessment and Instructional Activities for Early Childhood

Award # EDIES11C0044 Eugene Galanter, Children's Progress, Inc.

In this project, researchers developed and studied a supplemental assessment designed to identify gifted students in prekindergarten through second grade called the Computer Adaptive Triarchic Assessment and Instructional Activities for Early Childhood. This assessment supplements an existing assessment called the Children's Progress Academic Assessment. The orginal Children's Progress Academic assessment measures language arts and math abilities in prekindergarten to second-grade students. The new supplemental assessment was designed to identify gifted children through computer-adaptive methods that measured children's ability profiles in analytic, practical, and creative domains. The prototype of this supplemental assessment was developed under an earlier IES award.

Grade Levels:
EC, ES

Focal Populations:

Technology Developed/Studied:

Development of a Computerized Assessment of Executive Function for Preschool-Aged Children

Award # R324A120033 Laura Kuhn, University of North Carolina, Chapel Hill

In this project, researchers designed and validated a computerized assessment of executive function (a set of cognitive processes that help individuals manage cognitive resources during goal-related activities) for use with prekindergarten-aged children. The assessment aimed to identify executive function deficits in diverse groups of children. The computer-based assessment displayed text on the screen that described the nature of the task and an item that interviewers read to children. Simultaneously, the assessment displayed test stimuli to children on the touchscreen monitor. Children responded to each item by touching the screen, and their response was recorded.

Grade Levels:
EC

Focal Populations:
SWD

Technology Developed/Studied:

A Game-Based Intervention to Promote Executive Function and Reasoning in Early Learning

Award # EDIES14C0047 Grace Wardhana, Kiko Labs, Inc.

In this project, researchers iteratively developed and tested an intervention for children ages 3 to 6, which aimed to promote academic readiness through Thinking Time, a game-based tablet application . Children completed self-guided and adaptive activities focused on working memory, attention, impulse control, and flexibility.

Grade Levels:
EC, ES

Focal Populations:

Technology Developed/Studied:

A Randomized Trial of Two Promising Interventions for Students with Attention Problems

Award # R305H050036 David Rabiner, Duke University

In this project, researchers evaluated the impact of two interventions for second-grade students with attention problems: computerized attention training and computer-assisted instruction. The interventions aimed to help students whose academic achievement was significantly impaired by inattentive behavior in the classroom, even if the inattentive behavior was not severe enough to warrant a formal diagnosis of attention deficit hyperactivity disorder (ADHD). The computerized attention training software used for this project was Captain's Log, which was designed to train multiple components of attention. The computer-assisted instruction software used was Destination Reading and Math by Riverdeep.

Grade Levels:
ES

Focal Populations:
SWD

Technology Developed/Studied:

A Learning by Teaching Approach to Help Students Develop Self-Regulatory Skills in Middle School Science Classrooms

Award # R305H060089 Gautam Biswas, Vanderbilt University

In this project, researchers iteratively developed and studied Teachable Agents (TAs), a software intervention for middle school students to develop their metacognition (i.e., their awareness of their cognitive processes) and ability to learn through a learn-by-teaching approach. TAs were interactive computer-based learning environments in which 5th-grade students taught virtual students, called agents, how to understand various concepts. Students used three primary components to teach the agents: teaching an agent using a concept map, asking their own questions to see how much the agent understood, and quizzing the agent with a provided test to see how well it did on questions the student may not have considered.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

The Effect of Metacognition on Children's Control of their Study and of their Cognitive Processes

Award # R305H060161 Janet Metcalfe, Columbia University

In this project, researchers iteratively developed and studied a series of instructional strategies within a computerized game-based system called Dragon Master. The system was designed to improve third- and fifth-graders' ability to assess their own knowledge and to then use those self-assessments to more effectively allocate and organize study time. The team also examined whether the benefits of these strategies varied with the student's grade-level.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Harnessing Retrieval Practice to Enhance Learning in Diverse Domains

Award # R305B070537 Harold E. Pashler, University of California, San Diego

In this project, researchers iteratively developed and studied two interventions for elementary school, high school, and college students that aimed to improve students' learning of social studies and geography through memory retrieval practice. The two software systems were Hierarchical Retrieval Practice, which helped students review written information, and Visuospatial Retrieval Practice, which helped students review visual information. As part of the project, students interacted with these systems through the Internet and worked through a social studies study session that reviewed only material the student had not yet learned. Elementary school students also participated in a summer enrichment program and explored and used computerized geography-learning exercises to help them learn visual-spatial information.

Grade Levels:
ES, HS, PA

Focal Populations:

Technology Developed/Studied:

An Efficacy Study of Two Computer-Based Attention Training Systems in Schools

Award # R305A090100

Naomi Steiner, Tufts University, Tufts Medical Center

In this project, researchers evaluated the impact of two computer-based attention training systems with second- and fourth-grade students diagnosed with attention deficit hyperactivity disorder (ADHD). The interventions aimed to train children with ADHD to focus on a task. One intervention used Electroencephalography biofeedback, and the other intervention used a standard computer game format for cognitive retraining.

Grade Levels:
ES

Focal Populations:
SWD

Technology Developed/Studied:

Training Working Memory and Executive Control in Attention Deficit/Hyperactivity Disordered Children

Award # R324A090164

Priti Shah, University of Michigan

In this project, researchers iteratively developed and studied an intervention for elementary-age children with attention deficit hyperactivity disorder (ADHD) that aimed to enhance students' learning and academic outcomes through improving working memory. As part of the project, researchers collected data on features of the computer game that led to greater student engagement and motivation in order to optimize the game in improving working memory skills.

Grade Levels:
ES

Focal Populations:
SWD

Technology Developed/Studied:

Virtual Reality Applications for the Study of Attention and Learning in Children with Autism and ADHD

Award # R324A120168 Peter Mundy, University of California, Davis

In this project, researchers explored the relationships between student learning, academic achievement, and social outcomes for children in elementarty through high school with autism spectrum disorders (ASD). Students received an intervention designed to increase social attention skills via six 90-minute practice sessions over the course of 4 weeks. The intervention consisted of virtual reality-based "games" that provided opportunities to learn skills such as interpreting facial expressions and attending to peers and adults (e.g., teachers, parents) in order to improve students' social skills and increase their social engagement. The final analysis also explored whether the presence of attention deficit hyperactivity disorder (ADHD) in students with ASD may interact with the components of the intervention.

Grade Levels:
ES, MS, HS

Focal Populations:
SWD

Technology Developed/Studied:

Study Enhancement Based on Principles of Cognitive Science

Award # R305H030175 Janet Metcalfe, Columbia University

In this project, researchers evaluated the impact of an intervention for sixth- and seventh-grade students at high risk for academic failure. The intervention aimed to improve students' memory and vocabulary through a computer-based study program. The computer program supported students' acquisition of science, social science, and advanced English vocabulary terms.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Supporting Efficient and Durable Student Learning

Award # R305H050038 John Dunlosky, Kent State University

In this project, researchers iteratively developed and studied a new method of computer-assisted learning and study called retrieval-feedback-monitoring. Retrieval-feedback-monitoring was designed to support students' long-term learning and retention of key concepts in academic content areas. The project team completed laboratory research to optimize the process then implemented it with undergraduate psychology students and middle school science students.

Grade Levels:
MS, PA

Focal Populations:

Technology Developed/Studied:

Creating Scalable Interventions for Enhancing Student Learning and Performance
Award # R305A090324 Joshua Aronson, New York University

In this project, researchers iteratively developed and studied two computer-based interventions for eighth- and ninth-grade students to teach theories of intelligence that may support academic achievement (e.g., that people get smarter through intellectual effort not just because they're born intelligent). The interventions used engaging fiction in the form of an illustrated electronic book with a narrative message about the malleability of intelligence and interactive media through a virtual environment that contained the same message. The researchers posited that modifying students' attitudes about their intelligence would increase students' engagement and learning.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

Growth Mindset Learning Platform for Educators and Students: Supporting Academic Motivation and Achievement through an Integrated Online Platform
Award # EDIES10C0022 Lisa Sorich Blackwell, Mindset Works, LLC

In this project, researchers iteratively developed and studied a commercially viable Growth Mindset Learning Platform (GMLP) based on an existing program, called Brainology. The GMLP was a social-behavioral intervention designed to strengthen students' ability to succeed in school and life by teaching students how the brain learns and changes with effort and how to use effective study skills to increase learning. GMLP professional development applications addressed how to apply instructional supports to develop and sustain a growth mindset (i.e., the belief that one can improve his or her intelligence through effort and practice) in students in secondary school settings.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

Improving Academic Achievement by Teaching Growth Mindsets about Emotion
Award # R305A120671 James Gross, Stanford University

In this project, researchers iteratively developed and studied computer modules designed to teach sixth- and seventh-grade students an emotional growth mindset (i.e., the belief that one can control his or her emotions through effort and practice) with the goal of improving students' academic performance. The intervention consisted of modules that teach students that emotions can be regulated and how to regulate them effectively.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Comprehension SEEDING: Comprehension through Self-Explanation, Enhanced Discussion and Inquiry Generation

Award # R305A120808

Rodney Nielsen, Boulder Language Technologies, Inc.

In this project, researchers iteratively developed and studied a computer-based system and instructional method for sixth-grade students called Comprehension SEEDING: Comprehension through Self-Explanation, Enhanced Discussion and Inquiry Generation. The intervention aimed to engage all students in self-explanation of science concepts through three primary components: (1) inquiry generation, in which the teacher poses deep questions to students; (2) self-explanation, in which students submit their constructed responses via tablet computers; and (3) enhanced discussion, in which the computer system displays an answer prototypical of the group for the teacher and students to discuss.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

The Neural Markers of Effective Learning

Award # R305H030016

John Anderson, Carnegie Mellon University

In this project, researchers iteratively developed and studied an algebra unit focused on conceptually challenging word problems and added it to the ninth-grade algebra cognitive tutor program. The intervention aimed to improve the computer-based algebra tutor using both behavioral and brain imaging techniques. The researchers also examined various markers of successful learning in college students, using brain-imaging techniques to observe the learners' brain activity when insight and deep understanding were achieved and to observe the brain activity of high school students as they solved problems with the algebra computer tutor.

Grade Levels:
HS, PA

Focal Populations:

Technology Developed/Studied:

Computer-Enhanced Automated Lecture (CEAL)

Award # ED06PO0896

William Marshak, Syntronics, Inc.

In this project, researchers iteratively developed and studied a prototype of the Computer-Enhanced Automated Lecture (CEAL) for secondary and postsecondary students, which aimed to increase student engagement and subject knowledge through a web-based, open-source tool that administered lectures online, allowed student control of pace and content, facilitated note-taking, assessed student comprehension, and tracked student interaction.

Grade Levels:
HS, PA

Focal Populations:

Technology Developed/Studied:

Electronic Performance Support Systems (EPSS) as Assistive Technologies to Improve Outcomes for Secondary Students

Award # R324B070176 Gail Fitzgerald, University of Missouri, Columbia

In this project, researchers iteratively developed and studied the Strategy Tools Support System (STSS) for high schoolstudents with disabilities in general education settings. STSS aimed to help secondary students with learning disabilities or emotional disturbances improve their ability to learn on their own in general education classes. Researchers designed computerized support tools resembling graphic organizers to provide support for student behavior in the following areas: getting organized, learning new information, demonstrating learning, working on projects, solving personal problems, and planning for the future.

Grade Levels:
HS

Focal Populations:
SWD

Technology Developed/Studied:

The Impact of Theories of Intelligence on Self-Regulated Learning Strategies and Performance Improvement

Award # R305A130699 Joyce Ehrlinger, Washington State University

In this project, researchers explored whether a belief that a person could improve his or her own intelligence could lead students to use self-regulated learning strategies more often and in more effective ways. The studies focused on freshmen and sophomore high school students and whether adopting self-regulated learning strategies had consequences for their metacognitive accuracy (i.e., their ability to reflect upon their own cogntive processes and level of understanding) and sustained learning in mathematics. A web-based, educational, mathematics tutorial program, called Plato Learning Environment, was used to conduct the studies.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

The Efficacy of Personal Response Systems (Clickers) as Learning Tools: A Multidisciplinary, Large-Scale, Empirical Evaluation

Award # R305A100625 Amy Shapiro, University of Massachusetts, Dartmouth

In this project, researchers evaluated the impact of an intervention for college students, which aimed to improve their ability to answer factual and conceptual exam questions through using a personal response system (PRS, also known as "clickers") that allowed instructors to present multiple-choice questions to students. As part of the intervention, instructors used instructional PowerPoint presentations developed by the research team in which the researchers embedded PRS questions. Lecture materials required students to respond using clickers for some material.

Grade Levels:
PA

Focal Populations:

Technology Developed/Studied:

2. Math and Science Education

This chapter describes Institute-funded research on technologies that support math and science education, such as game-based math activities, on-line or distance education coures in math and science, and virtual science labs. Researchers have been working to develop and test the efficacy and effectivenss of technology to support the learning of mathematical and scientific concepts and skills, and some studies show evidence of enhanced learning through technology (e.g., Schenke, Rutherford, and Farkas 2014). A recent meta-analysis of education technology applications designed to support math instruction found an overall positive effect, but results varied considerably across interventions (Cheung and Slavin 2013).

Table Key

Grade levels:

EC	Early Childhood	HS	High School
ES	Elementary School	PA	Postsecondary and Adult Education
MS	Middle School		

Focal populations:

EL	English Learners
SWD	Students With Disabilities

Products developed or studied:


The spider web icon denotes **web-based** technology developed or studied.


The viewer icon denotes **virtual environment / interactive simulation** developed or studied.


The tutor icon denotes **intelligent tutor / artificial intelligence** technology developed or studied.


The chess piece icon denotes **game-based** technology developed or studied.


The checkmark icon denotes an **assessment** developed, validated, or studied.

For more information about these projects and publications stemming from them, please follow the hyperlinked award number to the online abstract on the Institute's website.

A Longitudinal Study of the Effects of a Pre-Kindergarten Mathematics Curriculum on Low-Income Children's Mathematical Knowledge

Award # R305J020026

Prentice Starkey, University of California, Berkeley

In this project, the researchers evaluated the Pre-K Mathematics curriculum supplemented with the DLM Early Childhood Express Math software. The Pre-K Mathematics curriculum consisted of materials for (1) small-group mathematics activities with concrete manipulatives for use by teachers and children in prekindergarten mathematics activities and (2) in-home activities for parents and prekindergarten-age children. The DLM Early Childhood Express Math software addressed geometric, spatial, numeric, and quantitative ideas and skills using a computer-based program in which children use pattern blocks and tangrams to complete puzzles and received individualized prekindergarten mathematics instruction.

Grade Levels:
EC

Focal Populations:

Technology Developed/Studied:

Developing an Intervention to Foster Early Number Sense and Skill

Award # R305K050082

Arthur Baroody, University of Illinois, Urbana-Champaign

In this project, researchers iteratively developed and studied three instructional approaches (indirect, semi-direct, and direct) to help prekindergarten through first-grade students at risk for developing difficulties learning mathematics to become fluent in basic addition and subtraction facts. The approaches were integrated into computer-based games. The indirect approach was based on the assumptions that computational fluency stems from number sense and that instruction should focus on constructing an explicit understanding of big ideas and discovering relations among basic facts. The semi-direct approach involved teaching reasoning strategies, such as the decomposition-to-ten strategy. The direct approach entailed extensive fact drills.

Grade Levels:
EC, ES

Focal Populations:

Technology Developed/Studied:

Scaling Up TRIAD: Teaching Early Mathematics for Understanding with Trajectories and Technologies

Award # R305K050157

Douglas Clements, State University of New York (SUNY), Buffalo

In this project, researchers evaluated the impact of the Technology-enhanced, Research-based, Instruction, Assessment, and professional Development (TRIAD) mathematics intervention implemented at scale in diverse geographical areas with diverse prekindergarten populations. Researchers posited that the TRIAD intervention would increase math achievement in young children, especially those at risk, by improving the implementation of the Building Blocks math curriculum, which included the DLM Early Childhood Math Software program. TRIAD not only included this curriculum but also provided professional development through distance education, a website that supported teaching based on learning trajectories, and classroom coaching.

Grade Levels:
EC

Focal Populations:

Technology Developed/Studied:

Scaling Up the Implementation of a Pre-Kindergarten Mathematics Curriculum in Public Preschool Programs

Award # R305K050186

Prentice Starkey, University of California, Berkeley

In this project, researchers evaluated the impact of a prekindergarten mathematics curriculum supplemented with the DLM Early Childhood Math Software program across two types of public prekindergarten programs serving low-income children (Head Start and state-funded prekindergartens). The intervention aimed to improve children's school readiness and subsequent achievement in math through a classroom component (small-group math activities, math software, and a math learning center), a home component (math activities and materials for families), and a professional development package for teachers that included a train-the-trainer model and distance education tools.

Grade Levels:
EC

Focal Populations:

Technology Developed/Studied:

Early Childhood Assessment and Intervention to Improve Grade School Students' Math and Reading

Award # ED07CO0039 — Christopher Camacho, Children's Progress, Inc.

In this project, researchers iteratively developed and studied a dynamic, web-delivered assessment tool to help teachers and parents identify deficits in prekindergarten through third-grade students' early literacy and math skills. The assessment was designed so that children could independently complete assessments and instruction on their classroom or home computer. The tool then provided teacher and parent reports and web-report videos that gave information on students' learning.

Grade Levels:
EC, ES

Focal Populations:

Technology Developed/Studied:

Closing the SES Related Gap in Young Children's Mathematical Knowledge

Award # R305A080697 — Prentice Starkey, University of California, Berkeley

In this project, researchers evaluated the impact of a prekindergarten math curriculum for 3- and 4-year-olds on children's mathematical knowledge. The curriculum, Pre-K Mathematics, includes seven units: Number Sense and Enumeration, Arithmetic Reasoning, Spatial Sense and Geometric Reasoning, Pattern Sense and Pattern Construction, Measurement and Data Representation, and Logical Relations. The intervention aimed to close the socioeconomic gap in early mathematical knowledge through teacher-guided small group activities and a software component, the DLM Math Software, that accommodated children's individual learning styles.

Grade Levels:
EC

Focal Populations:

Technology Developed/Studied:

Increasing the Efficacy of an Early Mathematics Curriculum with Scaffolding Designed to Promote Self-Regulation

Award # R305A080700 — Douglas Clements, State University of New York (SUNY), Buffalo

In this project, researchers evaluated the impact of an intervention that combined a software-based mathematics curriculum with one component of a social behavioral intervention. The two interventions included Building Blocks, an early childhood mathematics curriculum, and the Scaffolding Self-Regulation component of Tools of the Mind, an intervention with specific pedagogical strategies to improve young children's self-regulation competencies and academic achievement.

Grade Levels:
EC

Focal Populations:

Technology Developed/Studied:

Lens on Science: Development and Validation of a Computer-Administered, Adaptive, IRT-Based Science Assessment for Preschool Children

Award # R305A090502 Daryl Greenfield, University of Miami

In this project, researchers iteratively designed and validated Lens on Science, a computer-adaptive test of prekindergarteners' science knowledge. The researchers aimed to create an appropriate, reliable, and valid direct assessment of children's science knowledge and process skills. The test assessed three broad science content areas (life science, earth/space science, and physical/energy science) and science processing skills (observing, describing, comparing, questioning, predicting, experimenting, reflecting, and cooperating).

Grade Levels:
EC

Focal Populations:

Technology Developed/Studied:


Building Math Readiness in Young Deaf/Hard-of-Hearing Children: Parents as Partners

Award # R324A090145 Karen Kritzer, Kent State University

In this project, researchers iteratively developed and studied an online program to help parents of prekindergarten children ages 3 to 5 with hearing impairments increase their child's readiness for school mathematics. The intervention was based on natural, daily activities and aimed to increase parents' awareness of their role in mediating their child's learning. The researchers investigated whether involvement in the program influenced parent behavior in their interactions with their children, the degree to which this affected children's understanding of fundamental mathematics concepts, and the extent to which the mode of the intervention (in-person vs. online) was related to that change.

Grade Levels:
EC

Focal Populations:
SWD

Technology Developed/Studied:


Mathemantics Preschool → 3: Development and Evaluation of Mathematics Software for Children from Preschool to Grade 3

Award # R305A100267 Herbert Ginsburg, Columbia University, Teachers College

In this project, researchers iteratively developed and studied a software system, MathemAntics, for prekindergarten through third-grade students. MathemAntics aimed to provide mathematics instruction to children in an enjoyable, yet challenging, virtual world. It had three major components: (1) a special world of "posichicks" and "negacylces" (representing positive and negative numbers); (2) mathematical tools, such as boxes for grouping numbers, number lines, virtual manipulatives; and (3) formal mathematical symbols, such as standard algorithms. Graphical tools allowed students to operate virtual objects in ways not possible with physical manipulatives, and an avatar provided instruction, feedback, and support.

Grade Levels:
EC, ES

Focal Populations:

Technology Developed/Studied:


Enfoque en Ciencia: Extending the Cultural and Linguistic Validity of a Computer Adaptive Assessment of Science Readiness for Use with Young Latino Children

Award # R305A130612 Daryl Greenfield, University of Miami

In this project, researchers designed and validated Enfoque en Ciencia, an assessment for Latino prekindergarten children. This assessment was to be the Spanish version of the Lens on Science assesment, which was developed to assess three science domains (life science, earth/space science, and physical/energy science) and science processing skills (observing, describing, comparing, questioning, predicting, experimenting, reflecting, and cooperating). Students took the test on a touchscreen computer.

Grade Levels:
EC

Focal Populations:
EL

Technology Developed/Studied:


Spatial Training in Preschool: Identifying the Malleable Factors

Award # R305A140385 Roberta Golinkoff, University of Delaware

In this project, researchers explored the relationships between factors related to prekindergarten children's spatial skills and how knowledge of spatial reasoning related to early mathematics skills to identify potentially promising instructional practices. As part of the project, researchers developed a software application to deliver instruction to children through an electronic delivery device such as a tablet computer.

Grade Levels:
EC

Focal Populations:

Technology Developed/Studied:

Grounded and Transferable Knowledge of Complex Systems Using Computer Simulations

Award # R305H050116 Robert Goldstone, Indiana University

In this project, researchers iteratively developed and studied interactive computer simulations that provide perceptual support to students as they master abstract scientific principles. The final product was to also include a full curricula for teaching complex systems (complex, adaptive systems such as the biosphere and ecosystem) to support K-12 and college students.

Grade Levels:
ES, MS, HS, PA

Focal Populations:

Technology Developed/Studied:


Natural Math: An Empirically Derived Software for Mathematics Education

Award # ED06PO0921 Dmitri Droujkov, Natural Math

In this project, researchers iteratively developed a prototype of the Natural Math software for elementary school students, which used metaphors to show how mathematical principals manifest in the real world. The software included activities to help students learn multiplication and related concepts and included two modules called Natural Math Grids and Natural Math Mirrors. The prototype also included a web-based student collaboration feature.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Training in Experimental Design: Developing Scalable and Adaptive Computer-based Science Instruction

Award # R305H060034 David Klahr, Carnegie Mellon University

In this project, researchers iteratively developed and studied a computer-based intelligent tutoring system to improve elementary and middle school students' learning of scientific thinking. The intervention included computerized instructional modules with simulations, tracking of students' performance, and adaptive algorithms that provided feedback based on students' current actions and knowledge. Students who did not reach mastery in a particular module received one-on-one instruction.

Grade Levels:
ES, MS

Focal Populations:

Technology Developed/Studied:

Integrating Conceptual Foundations in Mathematics through the Application of Principles of Perceptual Learning

Award # R305H060070

Philip Kellman, University of California, Los Angeles

In this project, researchers iteratively developed and studied computer-based learning modules for students in the third through eighth grades. These modules were to be used with other modes of instruction, leading to an intervention designed to help students develop an integrated mathematical knowledge base in which measurement and fractions were meaningfully connected to each other and to core concepts of multiplication, division, ratio, and proportion. The intervention included six units of computer-based instructional materials that combined perceptual learning modules (i.e., units that aim to develop students' ability to recognize and use structure, patterns, and relationships by having them interact with information), computer-adaptive diagnostic assessments, benchmark lessons and investigations, and resources for teachers.

Grade Levels:
ES, MS

Focal Populations:

Technology Developed/Studied:

Getting Fractions Right with Technology-Mediated Peer-Assisted Learning (TechPALS)

Award # R305K060011

Jeremy Roschelle, SRI International

In this project, researchers iteratively developed and studied TechPALS, an intervention developed to improve mathematics achievement in elementary school students. The intervention used handheld computers to teach fractions in the context of peer-assisted learning. In TechPALS, a set of four mathematics-related activities covered a range of important concepts and skills related to rational numbers and fractions. The TechPALS software was driven by a database of mathematics tasks, each of which drew on and targeted well-known difficulties in learning fractions.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Evaluation of the First in Math Online Mathematics Program in New York City: A Randomized Control Trial

Award # R305B070048 John Flaherty, WestEd

In this project, researchers evaluated the impact of the First in Math online mathematics program on fourth- and fifth-grade student achievement. The First in Math® program was designed to be an online version of the 24®Game, in which players used various numbers and mathematical operations to reach a solution equaling 24. The study examined individual- and classroom-level conditions that influenced First in Math program use, the impact of First in Math on mathematics performance, and variation in impact across classrooms with high and low support of technology integration.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

mCLASS®:Math: Development and Analysis of an Integrated Screening, Progress Monitoring, and Cognitive Assessment System for K-3 Mathematics

Award # R305B070325 Herbert Ginsburg, Columbia University, Teachers College

In this project, researchers designed and validated a comprehensive handheld computer assessment system (mCLASS®:Math), which aimed to help kindergarten through third-grade teachers monitor student progress in mathematics and develop an understanding of cognitive processes that impede student performance. The system guided teachers in conducting the assessment and recording the results. The assessment included screening and progress monitoring measures and diagnostic cognitive interviews. Once the collected data were uploaded to an online server, the system prepared reports for teachers and for administrators. The system also provided information about informal strategies and concepts that teachers could use to improve student mathematics performance.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Improving Science Learning through Tutorial Dialogs

Award # R305B070434

Wayne Ward, Boulder Language Technologies, Inc.

In this project, researchers iteratively developed and studied an intelligent tutoring system that used a diaolog-questioning approach called Questioning the Author (QtA) and explored whether it could improve the effectiveness of the Full Option Science System (FOSS) curriculum, a structured science curriculum that helps many, but not all, students. The QtA approach aimed to help students dig more deeply into texts and to engage in dialogue with others (e.g., classmates) by pretending to ask the author questions. Using this approach, the system was designed to help elementary science students learn and integrate new concepts with what they already know.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

The Universally Designed Science Notebook: An Intervention to Support Science Learning for Students with Disabilities

Award # R324A070130

Gabrielle Rappolt-Schlichtmann, CAST, Inc.

In this project, researchers iteratively developed and studied a universally designed, web-based science notebook that was to be integrated into two units (magnetism and electricity) of an existing curriculum, Full Option Science System (FOSS). The notebook aimed to improve the science achievement of fourth- and fifth-grade students with high-incidence disabilities (such as attention deficit hyperactivity disorder (ADHD) and emotional disturbances) as well as general education students. To support classroom use of the notebook, researchers also developed a teacher training module and a teacher guide.

Grade Levels:
ES

Focal Populations:
SWD

Technology Developed/Studied:

Fostering Fluency with Basic Addition and Subtraction

Award # R305A080479

Arthur Baroody, University of Illinois, Urbana-Champaign

In this project, researchers evaluated the impact of a set of computerized game-based activities on how quickly and accurately K-2 students with mathematical learning difficulties and at risk for academic failure could perform single-digit, basic addition and subtraction. The intervention aimed to enhance speed and accuracy through four features: unstructured discovery learning, structured discovery learning, structured discovery learning plus active modeling reasoning strategies, and structured discovery learning plus active modeling and decomposition training.

Grade Levels:
ES

Focal Populations:
SWD

Technology Developed/Studied:

Teaching Every Student: Using Intelligent Tutoring and Universal Design to Customize the Mathematics Curriculum

Award # R305A080664

Beverly Woolf, University of Massachusetts, Amherst

In this project, researchers iteratively developed and studied two web-based mathematics intelligent tutoring systems for elementary, middle, and high school math students: Wayang Outpost and 4mality. Researchers aimed to increase student engagement and create a supportive and fruitful learning environment through the enhancement of three components: affect-detection software that estimated the emotional state of the user to determine the appropriate difficulty level for math problems, a suite of interventions to re-engage disengaged students, and assessment tools that informed teachers about each student's progress and affect.

Grade Levels:
ES, MS, HS

Focal Populations:

Technology Developed/Studied:

Math Monster Mystery: A Formative Assessment in Game Format for Grade 4 Mathematics

Award # EDIES09C0015

Robert Brown, Triad Digital Media

In this project, researchers iteratively developed and studied an online math computer game, Math Monster Mystery (M3), to serve as a formative assessment tool to measure fourth graders' mathematical understanding and to provide immediate feedback on instructional practice. Researchers developed the M3 game using narratives, graphics, and mathematical concepts aligned with the National Council of Mathematics Teachers' standards.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Refining and Validating the NimblePad

Award # EDIES09C0056

Thomas Hoffman, Nimble Assessments

In this project, researchers iteratively developed and studied NimblePad, an intervention for kindergarten to 12th-grade students as well as students with visual impairements that aimed to improve computer-based evaluations. NimblePad was designed to be a peripheral device that would allow students to write open-ended answers and make drawings that could substitute multiple-choice or typed responses and used math content as a starting point for the design. The device consisted of a pressure-pad, stylus pencil, display screen, and casing for blind and visually impaired students to place tactile overlays onto the touch sensitive screen.

Grade Levels:
ES, MS, HS

Focal Populations:
SWD

Technology Developed/Studied:

An Empirical Approach to Developing Web-based Math Learning Games to Improve Elementary School Student Outcomes

Award # EDIES10P0104 Snehal Patel, Sokikom

In this project, researchers iteratively developed and studied web-based math learning games. Researchers developed a series of web-based math learning games that incorporated research-based pedagogy; communal learning; and adaptive, standards-based content. The games were designed to supplement elementary students' existing in-class curricular materials and addressed topics such as fractions, place value and estimation, numeric operations, algebra functions and operations, measurement geometry, and statistics data analysis and probability.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Spatial Temporal Mathematics at Scale: An Innovative and Fully Developed Paradigm to Boost Math Achievement Among All Learners

Award # R305A090527 Michael Martinez, University of California, Irvine

In this project, researchers evaluated the impact of a computer game-based intervention called Spatial-Temporal Math®. In Spatial-Temporal Math®, elementary school students experienced math concepts and solved mathematics problems through representations that did not rely heavily on language or symbols. Instead, the goal was to assess the precise benefits of approaching math through spatial temporal reasoning. The project studied program effects on K-5 schools that served a diverse demographic, including economically disadvantaged students and English learners.

Grade Levels:
ES

Focal Populations:
EL

Technology Developed/Studied:

An Online Intelligent Tutoring System to Advance Learning in Math Games

Award # EDIES09C0009 Snehal Patel, Sokikom

In this project, researchers iteratively developed and studied a functioning prototype of Franchine, a learning game. Researchers developed the web-based, single-player fraction learning game for elementary school students. The researchers produced an intelligent tutoring system that was integrated within the existing game and was intended to provide the individualized instructional support required to improve student math outcomes.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Fablab Construction Station: Engaging Teacher and Students in Technology, Engineering, and Math

Award # EDIES10P0102 Gary Goldberger, Fablevision, Inc.

In this project, researchers iteratively developed and studied a prototype of FabLab Construction Station, a computer program designed to support second-grade teachers and students. FabLab allowed students to design two-dimensional and three-dimensional geometric shapes, bulletin boards, paper airplanes, pop-ups, and other materials. Researchers aligned the final product to outcomes in math and engineering and intended for the product to support the acquisition of knowledge in topics including shapes, geometry, pre-algebra, and measurement.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Developing and Evaluating a Technology-Based Fractions Intervention Program for Low-Achieving and At-risk Students

Award # R305A100110 Ted Hasselbring, Vanderbilt University

In this project, researchers iteratively developed and studied an intelligent tutoring system, called the Helping At-Risk and Low-Achieving Students in Fractions (HALF), for fifth- and sixth-grade students. The HALF system aimed to promote understanding of fractions by presenting learning problems in conjunction with virtual manipulatives and videos designed to link to-be-learned concepts within already-familiar topics. Researchers also created a professional development webinar to increase teachers' familiarity with and understanding of the software.

Grade Levels:
ES, MS

Focal Populations:

Technology Developed/Studied:

Promoting Transfer of the Control of Variables Strategy in Elementary and Middle School Children via Contextual Framing and Abstraction

Award # R305A100404 David Klahr, Carnegie Mellon University

In this project, researchers iteratively developed and studied Training in Experimental Design 2 (TED2), a web-based computer tutor for elementary and middle school students developed to support their conceptual understanding and procedural skills in designing and interpreting scientific experiments. The researchers conducted studies to explore the effects on student learning of varying instructional methods used by the online tutor.

Grade Levels:
ES, MS

Focal Populations:

Technology Developed/Studied:

Habitat Tracker: Learning about Scientific Inquiry through Digital Journaling at Wildlife Centers

Award # R305A100782 Paul Marty, Florida State University

In this project, researchers iteratively developed and studied the Habitat Tracker Digital Journal and the Habitat Tracker Community Website, which aimed to foster fourth- and fifth-grade students' understanding of scientific inquiry and the nature of science through student-led data collection and analysis, before, during, and after visits to a local wildlife center. The journal was an application for a handheld device through which students recorded observations, answered questions, and accessed multimedia content. The website was an interactive forum where students could read and edit their digital journal entries and contribute data about natural habitats they observed.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Project NumberShire: A Game-Based Integrated Learning and Assessment System to Target Whole Number Concepts

Award # EDIES11C0026 Marshall Gause, Thought Cycle, Inc.

In this project, researchers iteratively developed and studied NumberShire, a web-based mathematics game. The game aimed to integrate a learning and assessment gaming system to assess and teach whole number concepts to first-grade students with or at risk for mathematics disabilities. NumberShire included narrative-based mini-games in which students built an idyllic fairytale village by applying math concepts. Tasks included setting goals, advancing to more challenging levels, and engaging in competition.

Grade Levels:
ES

Focal Populations:
SWD

Technology Developed/Studied:

KinderTEK: Teaching Early Knowledge of Whole Number Concepts through Technology

Award # R324A110286 Mari Strand Cary, University of Oregon

In this project, researchers iteratively developed and studied KinderTEK, an iPad-based mathematics intervention for at-risk kindergarten students to improve their whole number understanding. The KinderTEK intervention was based on three components: critical content pertaining to whole number concepts (counting and cardinality, operations and algebraic thinking, and number and operations in base 10); research-based instructional design and delivery features (e.g., explicit instruction, scaffolding, visual representation, practice); and research-based technological design and delivery features.

Grade Levels:
ES

Focal Populations:
SWD

Technology Developed/Studied:

Combining Advantages of Collaborative and Individual Learning with an Intelligent Tutoring System for Fractions

Award # R305A120734 Vincent Aleven, Carnegie Mellon University

In this project, researchers iteratively adapted and tested the Cognitive Tutor® to create an intelligent tutoring system for fourth- and fifth-grade students studying fractions. The existing Cognitive Tutor® was a web-based intelligent tutoring system that covered a comprehensive set of topics in fractions learning. The adapted version integrated components that would allow for student collaboration and independent learning.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Development of a Game-based Integrated Learning and Assessment System to Target Whole Number Concepts (Project NumberShire)

Award # R324A120071 Hank Fien , University of Oregon

In this project, researchers iteratively developed and studied NumberShire-K, an intervention for first-grade students at risk for math disabilities, to help students learn and apply the mathematical concepts and skills of whole numbers. NumberShire-K was an internet-based, educational video game with research-based instructional design and delivery features that included scaffolded explicit instruction, opportunities for practice to improve fluency, goal setting, performance monitoring, and gaming elements to promote student motivation and engagement.

Grade Levels:
ES

Focal Populations:
SWD

Technology Developed/Studied:

Web Fluid Math

Award # EDIES13C0032 Donald Carney, FluidMath

In this project, researchers iteratively developed and studied a prototype of WebFluidMath, a software program to support fifth-grade students who were learning basic algebra principles. To use the WebFluidMath program, students wrote math expressions and made drawings on the screen of a tablet computer. The software recognized the handwritten math formulae and generated solutions in the form of algebraic expressions, computations, graphs, and dynamic animations.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Science4Us: Game-Based K-2 STEM Education for Teachers and Students

Award # EDIES13C0033 Catherine Christopher, Vkidz, Inc.

In this project, researchers iteratively developed and studied a prototype of Science4Us, a web-based gaming intervention for students in kindergarten through second grade. The games were designed to help them learn standard-based concepts in science, technology, engineering, and math. They were to include engaging and interactive simulations, investigations, stories and videos, as well as individual pages that allowed students to access their own set of digital scientific tools such as a notebook, a glossary, and animations.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Transmedia: Augmented Reality Game for Essential Transfer of Science

Award # EDIES13C0037 Victoria Van Voorhis, Second Avenue Software

In this project, researchers developed a prototype of a web-based game designed to teach fourth- through sixth-grade science concepts. The intervention used the illustrations of chemical elements and science terms created by Simon Basher in his three books, *The Periodic Table: Elements with Style!*, *Chemistry: Getting a Big Reaction!*, and *Physics: Why Matter Matters!* The game also included curriculum support materials.

Grade Levels:
ES, MS

Focal Populations:

Technology Developed/Studied:

Teachley: Math Facts - Design and Development of Intervention Software Promoting Single-Digit Operational Fluency

Award # EDIES13C0044 Kara Carpenter, Teachley, Inc.

In this project, researchers iteratively developed and studied MathFacts, a web-based game to support elementary students with math learning difficulties. The prototype of MathFacts was developed under a previous IES award. MathFacts was an application for touchscreen tablets that encouraged single-digit operational fluency, conceptual understanding, strategy awareness, and self-understanding. In the game, students learned content through mini-lessons, solved with problems in practice and speed rounds, and received formative feedback on their performance on built-in assessments. Researchers also developed a teacher management system to support professional development and produce reports to guide instruction.

Grade Levels:
ES

Focal Populations:
SWD

Technology Developed/Studied:

NumberShire II: Development of a Second Grade Game-Based Integrated Learning System to Target Whole Numbers and Operations in Base Ten and Operations and Algebraic Thinking

Award # EDIES13C0045 Marshall Gause, Thought Cycle, Inc.

In this project, researchers iteratively developed and studied NumberShire II, an integrated mathematics learning and assessment gaming system to foster the pre-algebraic thinking of second-grade students with or at risk for disabilities. The prototype of NumberShire II was developed under a previous IES award. The web-based game provided explicit, systematic, and frequent instruction, differential learning pathways, goal setting, and formative assessment-based performance monitoring.

Grade Levels:
ES

Focal Populations:
SWD

Technology Developed/Studied:

My Science Tutor: Improving Science Learning through Tutorial Dialogs (MyST)

Award # R305A130206 Wayne Ward, Boulder Language Technologies, Inc.

In this project, researchers evaluated the impact of a computer-based intelligent tutoring system called My Science Tutor (MyST) for third- through fifth-grade students. MyST was a supplement for the Full Option Science System (FOSS) curriculum, a non-textbook-based science curriculum focused on allowing students the opportunity to actively construct ideas through inquiry, experimentation, and analysis. Researchers evaluated the project by randomly assigning students to the one-on-one MyST tutoring or the control conditions (small-group human tutoring or business as usual) and measuring student science outcomes.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Use of Machine Learning to Adaptively Select Activity Types and Enhance Student Learning with an Intelligent Tutoring System

Award # R305A130215 Emma Brunskill, Carnegie Mellon University

In this project, researchers iteratively developed and studied web-based fraction learning tools for fourth- and fifth-grade students. The researchers extended their existing web-based intelligent tutoring system, the Fractions Tutor, to incorporate a broad set of activity types and to create a new method for automatically selecting individualized activities. The researchers aimed to increase student learning by developing new activities to promote sense-making and fluency-building and incorporated these into the Fractions Tutor.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Efficacy of an Integrated Digital Elementary School Mathematics Curriculum

Award # R305A130400 Jeremy Roschelle, SRI International

In this project, researchers evaluated the impact of Reasoning Mind (RM), a fully developed digital mathematics curriculum, which can serve as a primary, full-year, grade 5 curriculum. The intervention aimed to give students and teachers instant feedback, provide supports for learning, and offer engaging activities (such as games). RM aimed to help develop students' understanding of key topics on the pathway to algebra, such as the place value system, fractions, rational numbers, geometric measurement, and graphing points in a coordinate plane.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

S3: A Game-based 3rd Grade Math Curriculum

Award # EDIES14C0025 Snehal Patel, Sokikom

In this project, researchers iteratively adapted and tested S3, an intervention for third-grade teachers to enable them to use a digital dashboard to integrate supplemental math games within their instructional practice and the mathematics curriculum. The dashboard supported classroom implementation of 25 math topics aligned to third-grade Common Core Mathematics Standards and supported formative assessment whereby teachers provided targeted group and individualized support to students based on results and feedback from gameplay. The development work also included enhancements to existing games.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Introducing Desirable Difficulties for Educational Applications in Science

Award # R305H020113

Robert Bjork, University of California, Los Angeles

In this project, researchers explored whether interventions that appear to make learning more difficult and slow the rate of learning can be effective in enhancing long-term retention of information. The researchers aimed to determine whether these "desirable difficulties" could be generalized to realistic educational materials and contexts involving middle school and college students using the Web-based Inquiry Science Environment program.

Grade Levels:
MS, PA

Focal Populations:

Technology Developed/Studied:

Using Web-Based Cognitive Assessment Systems for Predicting Student Performance on State Exams

Award # R305K030140

Kenneth R. Koedinger, Carnegie Mellon University

In this project, researchers iteratively developed and studied a web-based cognitive assessment system. Researchers integrated assistance and assessment by using a web-based system, ASSISTments, which offered instruction to middle school students while providing a detailed evaluation of their abilities to the teacher. When students worked on the website, the system "learned" about the students' abilities and provided teachers with predictions of how the students would do on a standardized mathematics test. Teachers then used the system's detailed feedback to tailor their instruction to focus on the particular difficulties identified by the system.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Advancing the Math Skills of Low-Achieving Adolescents in Technology-Rich Learning Environments

Award # R305H040032

Brian Bottge, University of Wisconsin, Madison

In this project, researchers iteratively developed and studied Enhanced Anchored Instruction (EAI), a math intervention for average and low-achieving middle and high school students. EAI focused on improving students' problem-solving and basic skills (e.g., computation of whole numbers and fractions) and aimed to help them understand the importance and benefits of learning math. EAI used a mix of video-based problems delivered on CD-ROMs and hands-on projects (e.g., building skateboard ramps, compost bins, or hovercrafts). Students defined and understood the EAI problem, located the relevant pieces of information for solving it, and then integrated this information into a logical solution.

Grade Levels:
MS, HS

Focal Populations:
SWD

Technology Developed/Studied:

Dynamically Modifying the Learning Trajectories of Novices with Pedagogical Agents

Award # R305H050052 Carole Beal, University of Southern California

In this project, researchers iteratively adapted and tested the IMMEX (Interactive Multi-Media Exercises) program for middle and high school chemistry students to help them revise their chemistry problem solving strategies. IMMEX was designed to be a web-based problem-solving simulation program through which students could learn to frame a problem from a scenario, judge what information was relevant, plan a strategy, gather information, and reach a decision to demonstrate understanding. The researchers modified the intervention to integrate a pedagogical model into the system that provided neutral feedback (general encouragement) or individualized feedback that explicitly addressed how the student was approaching the problem.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

An Implementation of Vicarious Learning with Deep-Level Reasoning Questions in Middle School and High School Classrooms

Award # R305H050169 Barry Gholson, University of Memphis

In this project, researchers iteratively developed and studied AutoTutor, an intelligent tutoring system for middle and high school students to support computer literacy and knowledge of Newtonian physics. The researchers compared different versions of AutoTutor to examine how best to support students' learning of course content. Deep-level reasoning questions were embedded in the intelligent tutoring system. The tutor served as a conversational partner with the learner and encouraged students to provide answers to questions until they mastered each concept. The researchers also developed guidelines for teachers to support the use of AutoTutor during classroom instruction.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

Classroom Connectivity in Promoting Mathematics and Science Achievement

Award # R305K050045 Douglas Owens, Ohio State University

In this project, researchers evaluated the impact of connected classroom technology with interactive pedagogy and professional development on the mathematics and science achievement of students in grades 7 through 10. The connected classroom approach aimed to provide teachers with immediate information that they could use to adjust instruction. This information included displays of student work that were instantly aggregated and available on the teacher's computer as soon as student work was submitted. The intervention consisted of six parts: provision of connected classroom technology (TI-Navigator), professional development, teacher experiential learning in their own classrooms, online web-based training, online discussion forum for the teacher community, and follow-up professional development at an annual conference.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

AnimalWatch: An Intelligent Tutoring System for Grade 6 Mathematics

Award # R305K050086 Carole Beal, University of Southern California

In this project, researchers iteratively developed and studied AnimalWatch, a supplemental mathematics intelligent tutoring software for sixth-grade students. The software aimed to improve mathematics skill and achievement, particularly for students from groups that have been traditionally under-represented in science and engineering fields. The AnimalWatch software integrated mathematics problem solving and multimedia instruction with information about environmental science and endangered species. When students logged on to AnimalWatch, they adopted the role of a wildlife biologist charged with learning about and monitoring a particular endangered species.

Grade Levels:
MS

Focal Populations:
EL

Technology Developed/Studied:

Cinematic Sciences: An Online Simulation Platform with Real Physics and Behavioral Programming for Physical Sciences

Award # ED06C00039 — Daniel Savage, Whimsica Toys

In this project, researchers iteratively developed and studied Cinematic Sciences, a web-based, multimedia simulation platform designed to facilitate eighth-grade student learning in the physical sciences through game-based approaches. Researchers designed Cinematic Sciences to include 20 simulations aligned with the National Physical Sciences Standards as well as a web-based tool for teachers and students to create their own simulations.

Grade Levels:
MS

Focal Populations:
SWD

Technology Developed/Studied:

Videogame-Based Inquiry Learning Module for Science Literacy

Award # ED06PO0899 — Jeremiah Dibley, South Dakota Health Technology

In this project, researchers iteratively developed a prototype of Creature Control: Earth Day, a web-based video game designed to teach middle school science concepts that align with the National Science Education Standards. In Creature Control: Earth Day, earth science concepts were embedded into a virtual world where students learned about an ecosystem and how it could be disrupted by human impact.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Venture Map

Award # ED06PO0931 — Barry Minott, MW Productions, Inc.

In this project, researchers iteratively developed a software-based prototype of a new formative assessment feature for VentureMap, a project-based curriculum that teaches middle and high school students algebra concepts by having them manage a fictional music company. VentureMap was a tool that had students apply algebra principles to keep their company functioning by having them track sales, cost, and profit data, come up with production plans to increase profits, and design 2- and 3-dimensional marketing and packaging materials.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

Technology Enhanced Science Education in Middle School
Award # ED07CO0037
Peter Solomon, Advanced Fuel Research, Inc.

In this project, researchers iteratively developed and studied web-delivered science units focused on force and motion, position, energy, and gravity. These units were designed to replace or supplement middle school physical science curricula. Each unit included daily activity outlines, computer simulations with worksheets, instructions for hands-on experiments with worksheets, teacher instructions for each activity, animated tutorials, concept organizers, and paper-based pre- and post-tests. Researchers also developed a web-based teacher professional development course.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

The Tactus Immersive Learning Environment (TILE) for Enhancing Learning in High School Science Classrooms
Award # ED07CO0038
Kevin Chugh, Tactus Technologies, Inc.

In this project, researchers iteratively developed and studied a virtual reality simulation platform. The project team developed the Tactus Immersive Learning Environment (TILE) to facilitate student learning of core National Science Education Standards. Researchers intended TILE for use as a supplement to middle and high school science curricula, for primary instruction of concepts, for review of concepts, or for individual or small-group practice.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

Effectiveness of Cognitive Tutor® Algebra One Implemented at Scale
Award # R305A070185
John Pane, RAND Corporation

In this project, researchers evaluated the impact of the Cognitive Tutor® Algebra I curriculum on middle school students' mathematics achievement when the curriculum was implemented at-scale. Cognitive Tutor® aimed to promote students' understanding of algebraic concepts and principles, problem-solving skills, and mastery of higher order mathematical concepts. A central component of the Cognitive Tutor® was an automated computer-based tutor that provided individualized instruction to address students' specific needs. The individualization was built into the software and was facilitated by detailed computational models of student thinking in algebra.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Making Longitudinal Web-Based Assessments Give Cognitively Diagnostic Reports to Teachers, Parents, and Students While Employing Mastery Learning

Award # R305A070440

Neil T. Heffernan, Worcester Polytechnic Institute

In this project, researchers iteratively developed and studied the ASSISTments system, a computer-based assessment and tutoring system developed to track and support mastery learning in mathematics among sixth- and seventh-grade students. The system provided tutoring on the mathematics questions that students got wrong. Teachers also received instantaneous feedback on their students' progress, and parents received weekly reports detailing what their children learned as well as what specific skills were a struggle for students.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Bridging the Bridge to Algebra: Measuring and Optimizing the Influence of Prerequisite Skills on a Pre-Algebra Curriculum

Award # R305B070487

Philip Pavlik, Carnegie Mellon University

In this project, researchers iteratively developed and studied an intelligent computer tutor for middle school students to help them learn pre-algebra skills. The researchers designed the computer tutor to deliver practice sessions that targeted discrete prerequisite math skills. The system used a personalized model of each student's learning to determine when and how much practice was needed for each prerequisite skill while avoiding unnecessary review of skills the student had already mastered.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Principled Science Assessment Designs for Students with Disabilities

Award # R324A070035

Geneva Haertel, SRI International

In this project, researchers designed and validated a web-based universal test design paired with an approach termed "evidence-centered design" to develop or redesign test items that can more accurately evaluate the knowledge and skills of all students on statewide assessments. Specifically, the researchers aimed to evaluate the validity of inferences from existing state science assessments for students with and without disabilities, redesign assessment items, study the validity of inferences generated from the redesigned items, and develop research-based guidelines. The study focused on middle school science, but researchers also planned to apply the approach to other topics and age ranges.

Grade Levels:
MS

Focal Populations:
SWD

Technology Developed/Studied:

The Digital Earth Explorations Project to Enrich the Middle School Sciences

Award # ED08CO0050 George Newman, One Planet Education Network

In this project, researchers iteratively developed and studied a three-dimensional (3D), web-based, virtual reality game. The game was designed to act as a supplement to middle school life science, social studies, and persuasive writing curricula. The project team aligned the game to standards in the life sciences. In the game, students perform inquiry-based activities or quests to understand and solve problems that arise. Each adventure was designed to connect to specific academic standards and disciplinary content to help students better understand and value cultural and natural heritage.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Bringing Cognitive Tutors to the Internet: A Website that Helps Middle-School Students Learn Math

Award # R305A080093 Vincent Aleven, Carnegie Mellon University

In this project, researchers iteratively developed and studied a website for students in grades 6 through 8 where they could practice and develop their mathematics skills with artificial-intelligent software called Cognitive Tutor®. These tutors were designed to increase students' math achievement by providing step-by-step instruction in the areas of numbers and operations, algebra, data analysis, geometry, and ratios and proportional reasoning. The website also included support materials such as interactive worksheets and quizzes and automated reporting of student progress and performance for tutors, teachers, and parents.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Advancing Ecosystems Science Education via Situated Collaborative learning in Multi-User Virtual Environments

Award # R305A080141 Christopher Dede, Harvard University

In this project, researchers iteratively developed and studied a multi-user, virtual environment ecosystem science curriculum for sixth- and seventh-grade students in which students use graphical representations (avatars) to interact with other students and with computer-based agents to facilitate collaborative learning. The EcoMuve curriculum aimed to offer opportunities for student learning, engagement, and assessment through illustrating the situated geospatial relationships in an ecosystem; providing interactive, immersive depictions of plant and animal behavior; and generating student performance data. The intervention also included a workshop for teachers, a guide and curricular materials, and paper-based assessment instruments.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Multilevel Assessments of Science Standards (MASS)

Award # R305A080225 Edys Quellmalz, WestEd

In this project, researchers designed and validated technology-enhanced formative assessments to test eighth-grade students' science learning. The Multilevel Assessment of Science Standards (MASS) project aimed to bring best formative assessment practices into classrooms to transform what, how, when, and where science learning was assessed. MASS featured simulation-based tasks with immediate, individualized feedback and a hint system. It also gathered, documented, and promoted students' learning of connected science knowledge and extended inquiry not measured by large-scale tests.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Closing the Achievement Gap in Middle School Mathematics Utilizing Stanford University's Education Program for Gifted Youth Differentiated Mathematics Program

Award # R305A080464 Patrick Suppes, Stanford University

In this project, researchers evaluated the impact of Stanford University's Education Program for Gifted Youth (EPGY) intervention on middle school students' mathematics performance. Researchers aimed to determine the degree to which EPGY improved mathematics performance in middle schools with large percentages of minority students, English learners, and low-income students. The EPGY intervention was a computer-based program that was self-paced, individualized, and designed to detect and address gaps in student preparation. In addition, the EPGY interventionprovided information on student progress ranging from summaries of performance measures to detailed reports showing student learning trends, areas of strengths and weaknesses, and forecasts of end-of-year performance.

Grade Levels:
MS

Focal Populations:
EL

Technology Developed/Studied:

Scaffolding Students' Use of Multiple Representations for Science Learning

Award # R305A080507

Sadhana Puntambekar, University of Wisconsin, Madison

In this project, researchers iteratively developed and studied an approach to science instruction that used multiple modalities—text, hands-on experimentation, and interactive computer simulations—based on the Concept Mapped Project-based Activity Scaffolding System (CoMPASS). The intervention incorporated learner support both by the teacher and the computer. The researchers hypothesized that a careful integration of multiple modalities within an instructional unit and a design that supported learning between modalities would lead to a deeper conceptual understanding and improved student outcomes. Researchers tested the intervention with a racially and socioeconomically diverse group of middle school students, pre-service teachers, and college students.

Grade Levels:
MS, PA

Focal Populations:

Technology Developed/Studied:

Virtual Performance Assessments for Measuring Student Achievement in Science

Award # R305A080514

Christopher Dede, Harvard University

In this project, researchers validated the use of computer-based virtual performance assessments to assess middle school students' science inquiry skills in a standardized test setting. Researchers designed three single-user immersive three-dimensional (3D) environments to assess sixth- and seventh-grade students' science inquiry process learning in the context of life science. In the 3D environments, students took on the identity of a virtual persona that could move around, interact with the environment, and complete a science inquiry problem.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

SimScientists: Interactive Simulation-Based Science Learning Environments

Award # R305A080614

Edys Quellmalz, WestEd

In this project, researchers iteratively developed and studied SimScientists, a web-based simulation program to enrich science learning and assessment. SimScientists was developed for middle-school science students to promote complex science learning, particularly for underperforming students. SimScientists supplemented and extended existing middle school science instructional materials and presented students with problems to be solved by using science inquiry processes. The intervention also included embedded formative assessments, reflection activities, and teacher professional development.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Expanding the Science and Literacy Curricular Space: The GlobalEd 2 Project

Award # R305A080622 Scott Brown, University of Connecticut

In this project, researchers iteratively developed and studied GlobalEd 2, an intervention for eighth-grade students that built upon the interdisciplinary nature of social studies to facilitate students' abilities to write sophisticated persuasive text and understand important scientific principles. The intervention was a communication-intensive, technology-based instructional environment in which classrooms were assigned to represent particular countries in an online simulation-based scenario, and students worked collaboratively to resolve real-world international problems through scientific arguments in oral and written presentations.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

National Research & Development Center on Instructional Technology: Center for Advanced Technology in Schools

Award # R305C080015 Eva Baker, University of California, Los Angeles

In this project, researchers evaluated the impact of an online computer game designed to challenge and motivate pre-algebra students, particularly underperforming students, to participate and succeed in math. The researchers aimed to improve middle and high school students' learning of critically important math concepts such as pre-algebra and algebra. To succeed in the game, students used math skills to maneuver through levels that varied in difficulty via an embedded self-assessment component.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

National Research & Development Center on Instructional Technology: Possible Worlds

Award #R305C080022 Cornelia Brunner, Education Development Center, Inc.

In this project, researchers iteratively developed and studied Possible Worlds, a portable multimedia-enhanced curriculum developed to support science and literacy learning among seventh-grade students. Possible Worlds used the Nintendo Dual-Screen portable gaming environment and included three integrated supports: a motivating story context that unfolded over time in which students had a competitive role and were challenged to act as scientists, communication capacities between teacher and multi-player students to enhance classroom problem solving and teamwork and colloboration, and mini-games that built specific science knowledge and concrete literacy skills. As part of this project, the researchers created professional development materials and evaluated the impact of Possible Worlds on students' science and reading outcomes.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

ASSISTment Meets Science Learning (AMSL)

Award # R305A090170 Janice Gobert, Worcester Polytechnic Institute

In this project, researchers iteratively developed and studied a computer-based intelligent tutoring system, ASSISTments, which aimed to tutor middle school students in science inquiry and process skills. Materials in the modules addressed the following science strands: earth in the solar system, classification of organisms, structures and functions of cells, and systems of living things. The modules used microworlds to tutor students on science process skills needed to conduct inquiry. In the microworld, students were presented with a scenario and then asked to make predictions and answer questions about that scenario. The ASSISTments tutoring system provided support and feedback to students.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Efficacy Study of AnimalWatch: An Intelligent Tutoring System for Pre-Algebra

Award # R305A090197 Steve Schneider, WestEd

In this project, researchers evaluated the impact of the AnimalWatch System on students in pre-algebra. AnimalWatch System was an online computer-based intelligent tutor developed to build students' proficiency with pre-algebra mathematics operations with a specific focus on word problems and basic skills. The system provided students with individualized guided practice, immediate feedback to support self-correction and transfer, and opportunities to practice computational fluency.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Systems and Cycles: Using Structure-Behavior-Function Thinking as a Conceptual Tool for Understanding Complex Natural Systems in Middle School Science

Award # R305A090210 Cindy Hmelo-Silver, Rutgers University

In this project, researchers iteratively developed and studied three middle school science units on ecosystems, using structure-behavior-function thinking as a conceptual tool for promoting students' understanding of ecosystems. Structure-behavior-function models of systems explicitly represent the configuration of components and connections (structure), the visible output (functions), and the internal causal processes (behaviors) of the system. For each of three curriculum units on aquarium, local, and distal aquatic systems, researchers developed a suite of tools including a structure-behavior-function modeling environment, hypermedia, computer simulations, and a notebook for students to record observations and information gathered during physical data collection.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Adapterrex: Exploring the Learning Benefits of Erroneous Examples and their Dynamic Adaptations within the Context of Middle School Mathematics

Award # R305A090460 Bruce McLaren, Carnegie Mellon University

In this project, researchers iteratively developed and studied AdaptErrEx, an intelligent tutoring system for middle school math students to help students learn decimals. The system presented students with worked examples of problems in which each step of a problem solution path was presented for the students, along with feedback and instruction. The intervention presented students with examples that contained errors and instructed them to find the error with help from the tutoring system.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Learning by Teaching Synthetic Student: Using SimStudent to Study the Effect of Tutor Learning

Award # R305A090519 Noboru Matsuda, Carnegie Mellon University

In this project, researchers iteratively developed and studied SimStudent, an intelligent tutoring system for eighth- and ninth-grade Algebra I students to help them master algebra concepts related to solving linear equations. The tutoring system enabled students to improve their understanding of algebraic concepts, remediate their own misconceptions, and strengthen their problem-solving ability and procedural knowledge of solving linear equations.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

Applications of Intelligent Tutoring Systems (ITS) to Improve the Skill Levels of Students with Deficiencies in Mathematics

Award # R305A090528 Xiangen Hu, University of Memphis

In this project, researchers evaluated the impact of using the Assessment and Learning in Knowledge Spaces (ALEKS) system for use in after-school settings to improve the mathematical skills of struggling sixth-grade students. ALEKS, a web-based artificial intelligence assessment and learning system, used adaptive questioning to quickly and accurately determine what a student did and did not know.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Evaluating the Efficacy of Enhanced Anchored Instruction for Middle School Students with Learning Disabilities in Math

Award # R324A090179 Brian Bottge, University of Kentucky

In this project, researchers evaluated the impact of Enhanced Anchored Instruction (EAI), a mathematics pedagogical approach, on the math performance of middle school students with learning disabilities. EAI was to help develop students' math skills, such as problem solving, by providing them with additional opportunities to practice their skills as they solved new but analogous math problems. The intervention integrated video-based problems, hands-on projects, and explicit instructional units.

Grade Levels:
MS

Focal Populations:
SWD

Technology Developed/Studied:

The Math Learning Companion: An Individualized Intervention for Students with Math Learning Disabilities

Award # R324A090340 Lindy Crawford, Texas Christian University

In this project, researchers iteratively developed and studied the Math Learning Companion, a web-based mathematics intervention for sixth-grade students struggling with mathematics. The intervention aimed to improve student outcomes through four primary components: a supplemental sixth-grade mathematics curriculum with 48 standards-aligned multimedia lessons and additional self-paced content; support tools, including accommodations for students and reports for teachers; diagnostic math probes and assessments, as well as a progress monitoring system, designed to measure student growth; and an adaptive engine to capture student-program interactions, establish learner profiles and trajectories, and provide feedback to match student needs.

Grade Levels:
MS

Focal Populations:
SWD

Technology Developed/Studied:

Game-Based Interactive Life Science for Students with Learning Disabilities

Award # EDIES10C0023 Dan White, Filament Games

In this project, researchers iteratively developed and studied life science computer-based games. Researchers created these games using universal design principles to facilitate deeper conceptual understanding of the scientific inquiry process among middle school students—especially among struggling learners (e.g., English learners, those with reading deficiencies, and those with learning disabilities). The games provided tutorials and scaffolding where necessary to support student learning on topics including cells, heredity, evolution, bacteria, plants, and the human body.

Grade Levels:
MS

Focal Populations:
SWD, EL

Technology Developed/Studied:

Perceptual and Adaptive Learning Technologies: Developing Products to Improve Algebra Learning

Award # EDIES10C0024

Philip Kellman, Insight Learning Technology, Inc.

In this project, researchers iteratively developed and studied a web-based system of perceptual learning modules to support middle school students' learning of algebra and provide assessment information for teachers. The modules used adaptive learning technologies to expose students to different examples; help them notice similarities and differences across problems; and increase their ability to quickly and accurately manipulate algebraic expressions and equations, recognize patterns and map functions, and understand linear forms and relations. The final product was also to include a teacher handbook.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Planet First Energy World (PFEW)

Award # EDIES10P0103

George Newman, One Planet Education Network

In this project, researchers iteratively developed and studied a functioning prototype of a three-dimensional (3D) virtual environment. The prototype of the Planet First Energy Worlds included a 3D virtual environment to teach energy-related topics that addressed sixth-grade mathematics and science standards. The intervention used inquiry scenarios and disciplinary content to address different situations using a video game format immersed in 3D technology. The intervention included teacher professional development and support.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

A Theory-Driven Search for the Optimal Conditions of Instructional Guidance in Algebra Tutor

Award # R305A100109

John Anderson, Carnegie Mellon University

In this project, researchers explored the cognitive processes of seventh- through ninth-grade students as they solved algebra problems in the context of the Carnegie Learning Algebra Tutor software. The researchers used computer simulations of individual students (called "synthetic student models") to find the optimal conditions of instructional guidance a student needs to receive to master an algebra problem.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

An Adaptive Testing System for Diagnosing Sources of Mathematics Difficulties

Award #R305A100234

Susan Embretson, Georgia Institute of Technology

In this project, researchers designed and validated an online formative assessment system to diagnose the sources of middle school students' mathematics deficits and to provide information to teachers to guide instruction. The assessment system was to mirror math content addressed in state standards-based assessments and to consist of seven components: a diagnostic system, item bank, diagnostic item response theory model calibrations, adaptive item selection modules, an interactive online test delivery module, a score report module, and a validity module.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

STEM Solar Explorations

Award # EDIES11C0022

David Marley, Diversified Construction, Inc.

In this project, researchers iteratively developed and studied the STEM Solar Explorations platform, a multidisciplinary virtual laboratory for middle school students. The laboratory focused on solar energy fields and was developed to help students apply learning in the area of energy science. The researchers designed curricular materials, multi-media video clips, lesson plans, student activities, assessments, and a back-end system to house data generated by the activities.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Haptic Immersion Platform to Improve STEM Learning for the Visually Impaired

Award # EDIES11C0028

Marjorie Darrah, Information Research Corporation

In this project, researchers iteratively developed and studied Interactive Touch Science, an integrated software and hardware assistive technology platform. The product included a set of 20 applications that addressed standards-relevant content and aimed to support science, technology, engineering, and mathematics (STEM) learning among middle school students with (or without) visual impairments. The product also provided real-time tactile, visual, and audio feedback.

Grade Levels:
MS

Focal Populations:
SWD

Technology Developed/Studied:

Voyage to Galapagos: Development of a Differentiated Assistance Model in an Inquiry Learning Environment

Award #R305A110021 Daniel Brenner, WestEd

In this project, researchers evaluated the impact of combining SimScientists, a web-based simulations program to enrich science learning and assessment, with Voyage to Galapagos (VTG), an inquiry-driven instructional module that provided middle and high school biology students opportunities to simulate science field work in the Galapagos. Researchers created three versions of the VTG module, with each one providing different types of assistance (e.g., feedback after completing a level or feedback while working on a problem) within the SimScientists' web-based platform. Researchers then explored how students learn when receiving tutoring at different points in the simulation process and when the tutoring that they receive is contingent on their ability level.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

Learning the Visual Structure of Algebra Through Dynamic Interactions with Notation

Award # R305A110060 David Landy, University of Richmond

In this project, researchers iteratively developed and studied Pushing Symbols, an intervention for middle, high school, and remedial college students designed to enhance students' understanding of algebraic notations. The intervention used a set of verbal, physical, and computer-based visualizations to allow students to interact physically and dynamically with expression elements.

Grade Levels:
MS, HS, PA

Focal Populations:

Technology Developed/Studied:

Explanation and Prediction Increasing Gains and Metacognition (EPIGAME)

Award # R305A110782 Douglas Clark, Vanderbilt University

In this project, researchers iteratively developed and studied a game environment designed to support middle school students' understanding of formal physics concepts. The enviroment integrated prediction and explanation into a digital game, Cup Racer. By playing the game and using their predictions and explanations, students were to translate their intuitive understandings into explicit core concepts of Newtonian mechanics. The final product was to include computer adaptive assessments along with Cup Racer.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

An Examination of the Qualities of Interactive Science Learning Environments That Promote Optimal Motivation and Learning

Award # R305A110810 Steven McGee, The Learning Partnership

In this project, researchers explored the relationship between the strategies for increasing learning and the strategies for increasing interest and motivation in science that underlie Journey to El Yunque, a web-based ecology curriculum for middle school students. The researchers posited that variables that promote interest may be detrimental to learning whereas variables that advance learning may be detrimental to interest.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Expanding Audio Access to Mathematics Expressions by Students with Visual Impairments via MathML

Award # R324A110355 Lois Frankel, Educational Testing Service (ETS)

In this project, researchers iteratively developed and studied a standardized synthetic, speech-rendering tool for math instruction, test preparation, and testing for students in grades 8 through 11 with visual impairments. The tool used ClearSpeak, a mathematical markup language that can be integrated with existing screen reader software used by the visually impaired community. ClearSpeak translated math expressions into descriptions that students with visual impairments could better comprehend. The tool consisted of four components: standardized synthesized speech for rendering mathematical content (ClearSpeak), navigation tools for students, ClearSpeak integration capability with Microsoft Word, and customizable authoring tools for teachers.

Grade Levels:
MS, HS

Focal Populations:
SWD

Technology Developed/Studied:

Possible Worlds: Explorer Series

Award # EDIES12C0040 Tobi Saulnier, 1st Playable Productions

In this project, researchers iteratively developed and studied Possible Worlds, a prototype platform to host web-based interactive games. The project team developed the platform to help middle school students overcome scientific misconceptions. The researchers converted and enhanced games and materials for topics such as genetics, photosynthesis, electricity, and energy so that they could be used on tablet-based devices with touch-screen capabilities to enable more in-depth and interactive gameplay.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

An Efficacy Study of Online Mathematics Homework Support: An Evaluation of the ASSISTments Formative Assessment and Tutoring Platform

Award # R305A120125 Jeremy Roschelle, SRI International

In this project, researchers evaluated the impact of ASSISTments, an online formative assessment and mathematics tutoring platform for middle school students, focusing on its relative effectiveness with English learners and students with disabilities. ASSISTments allowed teachers to assign customized online homework to their students and then receive reports on each student's progress. Using ASSISTments, students would complete their homework on laptop computers and receive immediate feedback on their answers, individualized tutoring, hint messages on difficult problems, mastery problem sets that adjusted to knowledge level, and automatic reassessment of a subset of skills to help improve their retention of previously mastered skills.

Grade Levels:
MS

Focal Populations:
SWD, EL

Technology Developed/Studied:

SimSelf: A Simulation Environment Designed to Model and Scaffold Learners' Self-Regulation Skills to Optimize Complex Science Learning

Award # R305A120186 Gautam Biswas, Vanderbilt University

In this project, researchers iteratively developed and studied SimSelf, a computer-based learning environment for seventh- and eighth-grade students. SimSelf aimed to strengthen students' cognitive, metacognitive, motivational, and self-regulated learning processes to enhance students' ability to solve complex science problems. SimSelf had a suite of adaptive pedagogical agents (animated characters used in online learning) and services that monitored and provided supports to build student self-regulated learning skills and knowledge of science content necessary to engage in learning tasks or to solve complex science problems.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Perceptual Learning Technology in Mathematics Education: Efficacy and Replication

Award # R305A120288 Philip Kellman, University of California, Los Angeles

In this project, researchers evaluated the impact of a web-based intervention on sixth-grade math students. The intervention consisted of six units of instructional materials that combined perceptual learning modules (i.e., units that aim to develop students' ability to recognize and use structure, patterns, and relationships by having them interact with information), computer-adaptive diagnostic assessments, benchmark lessons and investigations, and resources for teachers.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

SimScientists Assessment System

Award # R305A120390 Edys Quellmalz, WestEd

In this project, researchers designed and validated a set of middle school computer simulation-based assessments for the life science strand of the SimScientists Assessment System. SimScientist was developed to be a web-based simulations program to enrich science learning and assessment. The researchers aimed to measure complex learning through simulation-based assessments that encompassed three units taught in middle school: cells, human body systems, and ecosystems.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

The Development of an Intelligent Pedagogical Agent for Physical Science Inquiry Driven by Educational Data Mining

Award # R305A120778 Janice Gobert, Worcester Polytechnic Institute

In this project, researchers iteratively developed and studied an online pedagogical agent (an animated character), designed to assist middle school students in new physical science topics. Researchers integrated the pedagogical agent into 12 previously developed physical science microworlds (small scale interactive simulations), in which students conducted scientific inquiry by generating hypotheses, collecting data to test their hypotheses, interpreting the data, warranting claims, and communicating findings. The pedagogical agent guided students through each step of the inquiry process and provided real-time scaffolding through validated assessments.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

AnimalWatch-VI Suite: A Comprehensive Program to Increase Access to Mathematics for Students with Visual Impairments

Award # R324A120006 Carole Beal, University of Arizona

In this project, researchers iteratively developed and studied Animal Suite-VI, an intervention for middle and high school students with visual impairments to help them master core algebra-readiness mathematics skills to succeed in high school and beyond. The intervention was a set of 14 web-delivered, accessible instructional modules covering computation, fractions, and variables and expressions. Each module included word problems and instructional scaffolding accessible via self-voicing software, accompanied by braille and tactile graphics. The researchers also developed training materials for teachers.

Grade Levels:
MS, HS

Focal Populations:
SWD

Technology Developed/Studied:

SciSkillQuest: A Standards-Based Game to Develop Students' Scientific Skills, Academic Mindsets, and Learning Strategies in Science

Award # EDIES13C0028 — Lisa Sorich Blackwell, Mindset Works, LLC

In this project, researchers iteratively developed and studied SciSkillQuest, an intervention for sixth- through eighth-grade students. SciSkillQuest was a web-based multiplayer game that aimed to teach students key scientific inquiry skills, along with the academic mindsets (beliefs students have about learning that can influence their behaviors) and learning strategies that facilitated engagement and effective science learning. The game included different paths to a solution, role-playing elements, immersive narratives, challenge-based progressions, and peer collaboration to engage players. Embedded in-game characters introduced and reinforced the message of growth mindset (i.e., the belief that ability and skill are developed through effort and learning).

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Empires: The First Socially-Networked Story-Based Math Game

Award # EDIES13C0043 — Scott Laidlaw, Imagine Education

In this project, researchers iteratively developed and studied Empires, a web-based game for seventh-grade students to engage and motivate them in mathematics learning. The prototype of this game was developed under a previous IES award. The game included a narrative-based story that applied learning of content and skills aligned to the Common Core State Standards in mathematics. As students played the game, they engaged in math-focused activities, such as taxing citizens to learn ratios and proportions, allocating resources to learn percentages, and measuring the distance and time to a neighboring empire by applying the principles of the Pythagorean Theorem.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Connecting Mathematical Ideas through Animated Multimodal Instruction

Award # R305A130016 — Martha W. Alibali, University of Wisconsin, Madison

In this project, researchers explored how to most effectively link ideas in algebra instruction using Gesturing Avatar for Learning and Education (GALE) with middle school students. The researchers used GALE, a software-based system with a human-like avatar teacher, to determine how different gestures and ways of communicating about connections among ideas foster student learning in mathematics.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

SimScientists Model Progressions

Award # R305A130160 Edys Quellmalz, WestEd

In this project, researchers iteratively developed and studied additional life science instructional suites for SimScientists, a web-based simulations program to enrich science learning and assessment for middle school students. Researchers also developed and validated the learning progressions, trajectories, and connections between multiple life science systems advocated in the Next Generation Science Standards and professional development that included a summer workshop and webinars. For this study, researchers focused on outcomes of students from a range of socioeconomic levels as well as disadvantaged students and English learners.

Grade Levels:
MS

Focal Populations:
EL

Technology Developed/Studied:

GlobalEd 2

Award # R305A130195 Scott Brown, University of Connecticut

In this project, researhers evaluated the impact of GlobalEd 2 (GE2), a set of online problem-based learning simulations for middle school students. GE2 focused on the multidisciplinary nature of social studies as an expanded curricular space for students to learn and apply scientific literacies and concepts in an international context. The researchers evaluated eighth-grade students' STEM (science, technology, engineering, and math) literacies, knowledge, and attitudes to determine whether results varied across diverse groups from both urban and suburban environments.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Happy Atoms

Award # EDIES14C0041 Jesse Schell, Schell Games

In this project, researchers iteratively developed and studied a tablet-based intervention for middle school science students to teach molecular composition. The intervention, Happy Atoms, was an interactive simulation that used physical manipulation of balls with embedded magnets that linked wirelessly to the tablet. The product recognized whether or not a student-created molecule existed and explained to students whether their created molecules were possible. The application also included teacher resources with instructional videos and curriculum suggestions that explained how to integrate the product into classroom practice.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Engaging Students in STEM: International Social Collaborative Exchange Network for Education: iSCENE

Award # EDIES14C0052 — Andri Loannidou, ActiveEd Joint Venture

In this project, researchers iteratively developed and studied a prototype of iSCENE, a virtual learning website for middle school students. iSCENE aimed to improve student engagement and motivation in STEM (science, techonlogy, engineering, and mathematics) using project-based cooperative learning, data exchange, resource sharing, and real-time communication in a science classroom setting.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Technology-interactive Classroom-embedded Modules for Measuring Challenging Math and Science Skills of ELs

Award # R305A140117 — Rebecca Kopriva, University of Wisconsin, Madison

In this project, researchers iteratively designed and validated a computer-based assessment for English learners (ELs) in middle school. It aimed to enhance students' math and science achievement through formative assessments that provided immediate feedback to students and teachers and produced specific, individualized, data-driven guidance targeted to improving instruction for ELs.

Grade Levels:
MS

Focal Populations:
EL

Technology Developed/Studied:

Integrated Software for Artificial Intelligence Tutoring and Assessment in Science

Award # R305K040008 — Benny Johnson, Quantum Simulations, Inc.

In this project, researchers iteratively developed and studied an online tutoring and assessment system for high school chemistry students called Quantum Chemistry Tutors. The system aimed to improve student learning and achievement by providing detailed comments to students if they made mistakes while trying to solve chemistry problems and by generating reports for teachers and students that analyzed student learning as reflected by their performance on a given set of chemistry problems.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Molecules and Minds: Optimizing Simulations for Chemistry Education

Award # R305K050140 Jan Plass, New York University

In this project, researchers iteratively developed and studied instructional computer simulations and curriculum for high school students to improve their learning and achievement in chemistry. The computer simulations imitated real-world chemistry processes (e.g., gas laws and the kinetic theory of heat) and were based on three principles of learning: active engagement of the learner, optimization of visual cognitive load, and consideration of the impact of learner characteristics (e.g., prior knowledge, spatial ability, and metacognitive skills) on the learning process.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

V-Frog: Applying Virtual Surgery Principles to Dissection Simulation

Award # R305S050019 Kevin Chugh, Tactus Technologies, Inc.

In this project, researchers iteratively developed and studied V-Frog, a virtual reality frog dissection software to serve as a substitute for or supplement to physical dissection in high school level biology. V-Frog was to be a three-dimensional environment in which students could engage in normal dissection actions (e.g., cutting with a scalpel, tugging with tweezers, and probing with a blunt probe), as well as actions that are not possible in physical dissection, such as endoscopy or watching a beating heart.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Virtual Physics Laboratory

Award # ED06PO0909 Jeanne Finstein, Polyhedron Learning Media, Inc.

In this project, researchers iteratively developed and studied an intervention for college students and advanced placement (AP) high school students that aimed to increase their physics knowledge through online laboratory experiments that had animations, brief video clips, simulated laboratory equipment, and data collection tools.

Grade Levels:
HS, PA

Focal Populations:

Technology Developed/Studied:

Math Messenger

Award # ED06PO0912 Hsinchao Liao, Creava, Inc.

In this project, researchers iteratively developed a prototype of Math Messenger, an online mathematics communication tool that combined instant messaging and texting technologies with the ability to write and edit formulas. Math Messenger was designed for use in online high school mathematics courses to facilitate collaboration on mathematical problems and to allow users to visualize graphical problems.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Fathom Dynamic Data Software

Award # ED06PO0930 William Finzer, KCP Technologies

In this project, researchers iteratively developed a prototype of Fathom Dynamic Data Software, an interactive tool and web-based curriculum focused on data analysis and statistics. Fathom Dynamic Data Software aimed to provide high school students with a background in data gathering, exploration, and analysis. The software was designed to be paired with Fathom Surveys, a product that streamlines the data collection process within the classroom. In addition to data analysis, the software was designed to allow students to gain experience with survey design and survey ethics.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Intelligent Molecular Model Kit and Software Suite for Improving High School Chemistry Instruction and Student Achievement

Award # ED07CO0044 Keith Donaldson, MolySym, Inc.

In this project, researchers iteratively developed and studied MolySym, an intelligent molecular modeling kit and software suite for advanced placement high school chemistry classes. MolySym allowed for real-time communication between student-built hand-held physical models and virtual software models that helped users to view changes in properties as they manipulated the molecular model in their hands.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Integrated Software for Artificial Intelligence Tutoring and Assessment in Science

Award # R305A070067 Benny Johnson, Quantum Simulations, Inc.

In this project, researchers iteratively developed and studied three new units for Quantum Chemistry Tutors, an internet-based tutoring and assessment system for high school chemistry developed under a pervious IES award. The system aimed to improve student learning and achievement in chemistry by providing feedback to students while they tried to solve chemistry problems. In addition, the system generated reports for teachers and students that analyzed student learning and performance.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Democratizing Access to Core Mathematics Grades 9-12

Award # R305B070430 Stephen Hegedus, University of Massachusetts, Dartmouth

In this project, researchers iteratively developed and studied SimCalc Connected Math Worlds. The Math Worlds curriculum was developed both to deepen high school students' understanding of core concepts within first- and second-year algebra and to connect and sustain the development of their mathematical understanding across higher mathematics classes. SimCalc Connected Math Worlds included curriculum materials and software supported through a wireless network. The software allowed teachers and students to have simultaneous access to student solutions, thus enabling teachers to provide immediate feedback to students as they solved algebraic problems.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Online Learning System to Advance Teaching of Hyper Molecular Modeling

Award # ED08CO0044 Keith Donaldson, MolySym, Inc.

In this project, researchers iteratively developed and studied a teaching and training interface for the MolySym Hypermodeling System. This system incorportated electronics and robotics technologies into ball-and-stick models to communicate in real-time with a software simulation system to improve students' understanding of important chemical principles relating to three dimensional molecular structures. To help deploy this tool in classrooms, researchers developed a teaching and training interface for MolySym, called the Online Learning System which included a report and assessment system for collecting data and measuring learning with hypermodels and simulations.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Electronic Chemistry Laboratory Workbook (ECLW)

Award # ED08CO0051 Christina Gilpin, Select-O-Sep, LLC

In this project, researchers iteratively developed and studied a simulation-based chemistry laboratory tool for high school students, Electronic Chemistry Laboratory Workbook (ECLW). The prototype of ECLW was developed under an earlier IES award. Researchers developed ECLW, a hardware interface with tactile controls used to carry out experimental computer simulations, to offer a realistic hands-on feeling for simulated lab experiments. It incorporated systematic and random errors, as well as visual and tactile feedback.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

A Randomized Controlled Study of the Effects of Intelligent Online Chemistry Tutors in Urban California School Districts

Award # R305A080063 Steve Schneider, WestEd

In this project, researchers evaluated the impact of Quantum Chemistry Tutors, a internet-based tutoring and assessment system, on high school chemistry students' performance. Researchers aimed to understand not only the efficacy of the intervention but also the general effects of intelligent tutoring software on student learning when used in conjunction with a range of commercially available science curricula. Quantum Chemistry Tutors provided individual tutoring to high school students to support student thinking and performance through adaptive questioning, modeling, illustration, and explanation of issues within the context of the student's work.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Guru: A Computer Tutor that Models Expert Human Tutors

Award # R305A080594 Andrew Olney, University of Memphis

In this project, researchers iteratively developed and studied Guru, a computer-based intelligent tutoring system for high school students to promote educational attainment by targeting biology content that students must master in order to graduate. Students interacted with the Guru animated agent by having a conversation with the tutor. During the course of the conversation, Guru and the student worked through biology topics and problems through a multimedia panel that presented movies, interactive diagrams, and other instructional media.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Agile Mind Visualizations to Increase High School Biology Learning
Award # EDIES09C0017 Linda Chaput, Agile Mind, Inc.

In this project, researchers iteratively developed and studied interactive, animated visualizations of key science concepts to increase student engagement in learning. The project team designed several visualizations and then embedded them within Agile Minds' existing online high school biology course services. The product also included online, real-time teacher support to enable successful integration of the technology within classroom practice.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Testing the Effectiveness of CALM for High School Chemistry Students
Award # R305A090195 Jonathan Plucker, Indiana University

In this project, researchers evaluated the impact of the Computer Assisted Learning Method (CALM), a chemistry program, on high school students' science achievement. CALM consisted of two components: the CALM online learning tool and the CALM teacher professional development workshop. The CALM online learning tool allowed students to practice solving chemistry problems on topics such as balancing chemical reactions and kinetics. Teachers received a professional development workshop to learn about the underlying philosophy of CALM and the mechanics of its use.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Promoting Robust Understanding of Genetics with a Cognitive Tutor that Integrates Conceptual Learning with Problem Solving
Award # R305A090549 Albert Corbett, Carnegie Mellon University

In this project, researchers iteratively developed and studied new modules for the Carnegie Mellon Genetics Cognitive Tutor® (GCT), an intelligent tutoring system for learning genetics. The new GCT modules used problem solving to help high school students understand genetics processes more fully and to help students learn how to form hypotheses based on observations. Researchers integrated the new GCT modules with existing GCT modules to form a new Conceptually Grounded Genetics Problem Solving environment.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Embedded Assessments Using the ChemCollective Virtual Lab

Award # R305A100069 Jodi Davenport, WestEd

In this project, researchers iteratively developed and studied new activities with embedded assessments for the previously developed ChemCollective Virtual Lab. The components developed in this project consisted of two online modules with ChemCollective Virtual Lab activities and embedded assessments focused on stoichiometry and thermochemistry in which students received authentic chemistry investigations and personalized coaching. ChemCollective Virtual Lab also provided teachers with formative assessment information about individual students that they could use to monitor student progress and guide instruction.

Grade Levels:
HS

Focal Populations:
EL

Technology Developed/Studied:

Improving Students' Skill at Solving Equations through Better Encoding of Algebraic Concepts

Award # R305A100074 Julie Booth, Temple University

In this project, researchers iteratively developed and studied the Algebra I Cognitive Tutor®, a computer program for Algebra I high school students to help them overcome misconceptions in algebra through the use of incorrect examples and self-explanation exercises. The intervention provided high school students with different types of self-explanation exercises: typical self-explanation (designed to help them discover and strengthen correct strategies) and corrective self-explanation (designed to help them understand why ineffective strategies were incorrect).

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Improving a Natural-Language Tutoring System that Engages Students in Deep Reasoning Dialogues about Physics

Award # R305A100163 Sandra Katz, University of Pittsburgh

In this project, researchers iteratively refined and tested Andes, an intelligent, web-based tutoring system for physics. Andes was developed to help students reason deeply about and reflect on physics problems. This project focused on refining the dialog capabilities of Andes using natural-language processing so that the system could integrate the student's words into its reponse while also determining whether the student was missing important concepts or overgeneralizing by analyzing the level of abstraction in the student's response.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

DeepTutor: An Intelligent Tutoring System Based on Deep Language and Discourse Processing and Advanced Tutoring Strategies

Award # R305A100875 Vasile Rus, University of Memphis

In this project, researchers iteratively developed and studied DeepTutor, an intelligent, dialog-based tutoring system for high school students. DeepTutor aimed to improve students' outcomes in physics relative to a tutoring system called AutoTutor, an alternative, interactive automated tutoring software program. DeepTutor focused on accurate assessment, clear communication, and advanced tutoring and instructional strategies to improve tutoring quality and learning.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

The Connected Chemistry Curriculum

Award # R305A100992 Mike Stieff, University of Illinois, Chicago

In this project, researchers iteratively developed and studied Connected Chemistry, a curriculum for high school chemistry students meant to improve their understanding of and achievement in science through computer-based activities. The curriculum used computer-based visualization tools to link the sub micro-level reactions students saw to their everyday experience at the macro-level. Each curriculum unit consisted of three modules: (1) laboratory/demonstration, in which students performed an experiment; (2) simulation, in which students explored a simulation; and (3) discussion, in which the teacher led students through a synthesis of their observations.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Virtual Labs for High School Physics

Award # EDIES11C0029 Jeanne Finstein, Polyhedron Learning Media, Inc.

In this project, researchers iteratively developed and studied a virtual physics lab. The prototype of this product was developed under an earlier IES award. Researchers developed a set of cost-effective and maintenance-free web-based virtual labs on topics such as displacement, velocity, acceleration of gravity, kinematics, and Newton's second law that could fully replace or supplement hands-on labs in a typical high school physics course. The online virtual physics labs were designed to be used when equipment was not available or as a supplement before or after using real equipment. Researchers also developed supporting professional development materials.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Assessing the Efficacy of Online Credit Recovery in Algebra I for At-Risk Ninth Graders
Award # R305A110149 Jessica Heppen, American Institutes for Research

In this project, researchers evaluated the impact of offering an online Algebra I course for first-time ninth graders who failed the second semester of Algebra I. Researchers aimed to produce rigorous evidence about credit recovery programs by conducting three studies: the first study compared the impacts of the online course to a traditional in-class summer course; the second study examined whether students in schools offering the summer Algebra recovery course showed improved outcomes compared to students in schools that did not offer the course; and the third study compared how students who succeeded in their credit recovery course did versus ninth-grade students who passed Algebra I.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Cyber-enabled Tangible Molecular Models for High School
Award # R305A120047 Jodi Davenport, WestEd

In this project, researchers iteratively developed and studied cyber-enabled tangible molecular models and companion activities for high school biology students. The intervention aimed to enhance the instruction of core concepts of molecular biology taught in high school (protein structure, enzymes, DNA, and viruses) through physical, flexible models of molecules. As users manipulated the models in front of a computer's webcam, the software tracked the motion of the physics models in real-time. Researchers posited that the physical manipulation could promote students' understanding of how proteins interact and illustrate how secondary and tertiary structures emerge during the movement.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Exploring Studies to Derive Policies for Adaptive Natural-language Tutoring in Physics
Award # R305A130441 Sandra Katz, University of Pittsburgh

In this project, researchers explored how different approaches to designing intelligent tutoring systmes correlate with improvements in student outcomes in physics. Rimac, the intervention used to identify malleable factors of intelligent tutoring systems, targeted high school physics students in urban, suburban, and parochial school districts. The researchers aimed to identify effective malleable factors to inform the development of a future intelligent tutoring systems intervention and, more broadly, to inform one-on-one tutoring and classroom instructional practices.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Eco: An Online Virtual World for Secondary School Environmental Literacy and Collaborative Problem Solving

Award # EDIES14C0044 John Krajewski, Strange Loop Games

In this project, researchers iteratively developed and studied an intervention for high school students called Eco that aimed to improve environmental literacy. It used a multi-player game-based application in which students participated in a virtual online environment featuring a simulated ecosystem of plants and animals. Students measured, modeled, and analyzed the game's underlying ecosystem and proposed plans to classmates as part of group decisionmaking.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Efficacy of ALEKS for Improving Student Algebra Achievement

Award # R305A140221 John Pane, RAND Corporation

In this project, researchers evaluated the impact of ALEKS (Assessment and Learning in Knowledge Spaces), an intervention for Algebra 1 students that aimed to improve students' mathematics outcomes through a web-based intelligent tutoring system. ALEKS assessed individual student knowledge, provided individualized mathematics instruction based on the data gathered from assessments and learning, and reassessed students periodically to ensure learning and mastery. It also generated reports for teachers to inform instructional decisions.

Grade Levels:
HS

Focal Populations:
EL

Technology Developed/Studied:

A Virtual Launchpad for Learning at Higher Speeds

Award # ED06PO0900 Phillip L. Senger, Current Conceptions, Inc.

In this project, researchers iteratively developed a prototype of Virtual Learning LaunchPad, a virtual learning platform designed to enable college students to learn health-related biological information at a faster rate than students who view traditional video lectures on the same subject matter. Virtual Learning LaunchPad combined non-traditional instructional delivery methods, such as the use of three-dimensonal anatomical reconstructions, step-by-step animations, streaming-animations, voice-overs, and instant replay of important components. The first topic covered by the prototype was reproductive science.

Grade Levels:
PA

Focal Populations:

Technology Developed/Studied:

Virtual Physics Laboratory

Award # ED07CO0040 Jeanne Finstein, Polyhedron Learning Media, Inc.

In this project, researchers iteratively developed and studied Virtual Physics Laboratory. The prototype of this product was developed under a previous IES award. Researchers developed a set of web-based virtual labs on topics such as vector addition of forces, uniform motion, kinematics, Newton's Second Law, and conservation of energy. These labs were intended to either fully replace or serve as a supplement to hands-on labs in a typical introductory college physics course.

Grade Levels:
PA

Focal Populations:

Technology Developed/Studied:

Acquiring Research Investigative and Evaluative Skills (ARIES) for Scientific Inquiry

Award # R305B070349 Keith Millis, Northern Illinois University

In this project, researchers iteratively developed and studied ARIES (Acquiring Research Investigative and Evaluative Skills), an interactive intelligent tutor for college students designed to teach students scientific inquiry skills. Students read an online text describing and explaining key concepts in scientific inquiry. To promote deep learning, students taught an animated "other-agent" (a learner like the student) while the "guide-agent" (the tutor) looked on and made suggestions, using the AutoTutor software, which mimics the dialog moves between human tutors and students. To motivate students, the system incorporated game elements and granted points for correct answers. Later, students applied the learned concepts to problems that required the critical evaluation of studies and causal claims.

Grade Levels:
PA

Focal Populations:

Technology Developed/Studied:

Higher Learning @ Higher Speeds in Biosciences Using Time Compressed Animated Delivery (TCAD)

Award # ED008CO0050 Phillip L Senger, Current Conceptions, Inc.

In this project, researchers iteratively developed and studied the Time Compressed Animated Delivery (TCAD) system consisting of short (10 to 15 minutes) animated units to teach the reproductive sciences. The content was designed to be delivered in approximately half the time required by traditional lecture methods. The TCAD was designed to educate college students about core biologic principles with a focus on how these principles affect personal reproductive health.

Grade Levels:
PA

Focal Populations:

Technology Developed/Studied:

Math Education for Adult Learners and College Remediation Using Artificial Intelligence

Award # EDIES11C0041 Benny Johnson, Quantum Simulations, Inc.

In this project, researchers iteratively developed and studied Quantum Tutors, a web-based artificial intelligence tutor. The prototype of this tutor was developed under a previous IES award. The project aimed to extend artificial intelligence methodologies to an on-demand tutor focused on developmental mathematics for adult learners and underprepared college students requiring remediation. The project team programmed the web-based artificial intelligence tutor with an automated assessment feature to check responses and offer immediate tutoring on any mistakes.

Grade Levels:
PA

Focal Populations:

Technology Developed/Studied:

Using Computer-Assisted Instruction to Accelerate Students through Developmental Math: An Impact Study of Modularization and Compression

Award # R305A130125 Mary Visher, MDRC

In this project, researchers evaluated the impact of a computer-assisted developmental math curriculum and placement policies for Texas community college students in need of remediation. The developmental math curriculum studied in this project divided the math content into discrete modules that were presented on computers, allowing students to learn at their own pace. The placement policy included using students' scores on placement exams to determine whether they could enter directly into credit-bearing courses, be encouraged to take a developmental math course or, if the student scored particularly low, take more basic-level courses.

Grade Levels:
PA

Focal Populations:

Technology Developed/Studied:

Khan Academy Resources for Maximizing Mathematics Achievement: A Postsecondary Mathematics Efficacy Study

Award # R305A140340 Steve Schneider, WestED

In this project, researchers evaluated the impact of an intervention for college students designed to increase students' success in developmental math courses. Teachers in these courses used Khan Academy (an online environment that included instructional videos, adaptive problem sets, and tools) to individualize coaching and assignments to students. Students used Khan Academy for computer-assisted instruction and to access resources at home to study new material.

Grade Levels:
PA

Focal Populations:

Technology Developed/Studied:

Bootstrapping Achievement and Motivation in STEM: An Integrated Cognitive-Motivational Intervention to Improve Biology Grades

Award # R305A140602 Jennifer Cromley, Temple University

In this project, researchers iteratively developed and studied an online curriculum delivered via Blackboard designed to aid the teaching of introductory biology at postsecondary institutions. The curriculum was designed to incorporate different approaches that addressed students' motivational needs as well as their content-knowledge needs. Such strategies included relevance writing tasks, in which students write a series of letters to themselves regarding the relevance of the biology course for their learning, major, career, and life goals; brief weekly multimedia videos intended to prime prior knowledge; and videotaped worked examples of short, medium-difficulty problems.

Grade Levels:
PA

Focal Populations:

Technology Developed/Studied:

3. Reading, Writing, and Language Development

This chapter includes Institute-funded research on technologies that support and improve reading, writing, and language development. A wide range of educational technologies have been developed and studied to promote reading and writing skills, such as game-based literacy programs for struggling readers and English learners, intelligent tutoring systems to promote writing skills, and mobile technologies for greater access to reading materials. For example, Institute-funded projects include an interactive singing software program for struggling readers (Biggs et al. 2008); "wiki writers," a program that connects students and teachers across communities (Andres and Claggett 2011); and a game-based mobile application to learn vocabulary (Sandberg, Maris, and Hoogendoorn 2014).

Table Key

Grade levels:

EC	Early Childhood	HS	High School
ES	Elementary School	PA	Postsecondary and Adult Education
MS	Middle School		

Focal populations:

EL	English Learners
SWD	Students With Disabilities

Products developed or studied:


The spider web icon denotes **web-based** technology developed or studied.


The viewer icon denotes **virtual environment / interactive simulation** developed or studied.


The tutor icon denotes **intelligent tutor / artificial intelligence** technology developed or studied.


The chess piece icon denotes **game-based** technology developed or studied.


The checkmark icon denotes an **assessment** developed, validated, or studied.

For more information about these projects and publications stemming from them, please follow the hyperlinked award number to the online abstract on the Institute's website.

A Longitudinal Study of the Effectiveness of a Pre-K Multisensory Literacy Curriculum

Award # R305J030037 — Anne Cunningham, University of California, Berkeley

In this project, researchers evaluated the impact of the Ready, Set, Leap! (RSL) literacy curriculum for at-risk prekindergarten children. The RSL intervention aimed to develop children's literacy skills by combining research-based instructional approaches with multisensory technology using LeapFrog products. The technology was designed to provide center-based activities that integrated the senses of touch, sight, and sound to encourage student engagement and that provided individualized student feedback and support throughout the learning process.

Grade Levels: EC

Focal Populations:

Technology Developed/Studied:

Project PREPARE: Teaching Service Words to Deaf Children

Award # R305S050034 — Susan Watkins, Hope, Inc.

In this project, researchers iteratively developed and studied an intervention for prekindergarten- through first-grade deaf students that aimed to improve students' knowledge of service words through a CD-ROM-based series of animations, games, and evaluations. Students participated in 13 units organized around a theme and word category, including prepositions, conjunctions, articles, adverbs, adjectives, and pronouns. The series was provided in American Sign Language, Spoken English, and Manually Coded English (English that is signed).

Grade Levels: EC, ES

Focal Populations: SWD

Technology Developed/Studied:

Early Childhood Assessment and Intervention to Improve Grade School Students' Math and Reading

Award # ED07CO0039 — Christopher Camacho, Children's Progress, Inc.

In this project, researchers iteratively developed and studied a dynamic, web-delivered assessment tool to help teachers and parents identify deficits in prekindergarten through third-grade students' early literacy and math skills. The assessment was designed so that children could independently complete assessments and instruction on their classroom or home computer. The tool then provided teacher and parent reports and web-report videos that gave information on students' learning.

Grade Levels: EC, ES

Focal Populations:

Technology Developed/Studied:

Parent-implemented Language Intervention for Young Children with Developmental Disabilities

Award # R324A070122 MaryAnn Romski, Georgia State University

In this project, researchers iteratively developed and studied an intervention for children with developmental disabilities designed to increase their language proficiency through a parent-implemented language intervention. As part of the project, parents used a speech-generating device to provide communication input to the child, and the child used the device to produce communication. As part of the project, the researchers compared the effects of two interventions: one with language production only and one with both language comprehension and production.

Grade Levels:
EC, ES

Focal Populations:
SWD

Technology Developed/Studied:

Using Educational Television to Enhance Young Children's Language and Vocabulary Skills

Award # R305A080476 Beth Phillips, Florida State University

In this project, researchers iteratively developed and studied an intervention for lowincome, at-risk prekindergarten children. It aimed to enhance and accelerate their vocabulary and language acquisition through vocabulary instruction, videos, vocabulary activities, and shared story time. As part of the project, children viewed video segments from television programs including Sesame Street, Martha Speaks, and Between the Lions.

Grade Levels:
EC

Focal Populations:

Technology Developed/Studied:

The World of Words: An Embedded Multimedia Vocabulary Intervention for Economically Disadvantaged Pre-K Children

Award # R305A090013 Susan Neuman, University of Michigan

In this project, researchers iteratively designed and tested World of Words, a supplementary vocabulary curriculum for prekindergarten children from low-income families to address the gap in vocabulary knowledge between children from economically disadvantaged backgrounds and their middle-class peers. The curriculum taught word meanings through an embedded multimedia framework. As part of the intervention, students engaged with video, information books, picture cards, and take-home books.

Grade Levels:
EC

Focal Populations:

Technology Developed/Studied:

Assessing Reading for Understanding: A Theory-based, Developmental Approach

Award # R305F100005 John Sabatini, Educational Testing Service

In this project, a part of the Reading for Understanding Research Initiative, researchers developled and validated two computer-based reading assessments for use with students in prekindergarten through high school. One assessment, the Florida Reading Assessment (FRA), was designed to be a computer-adaptive assessment to provide diagnostic information on skills that support reading comprehension. The second assessment, the Global, Integrated, Sceniaro-Based Assessments (GISA), was designed to be a scenario-based assessment to provide information about reading comprehension and performance moderators (e.g., students' background knowledge and motivation). The GISA scenarios included authentic tasks (such as reviewing websites) and having students work with computer-generated avatars to simulate peer activities.

Grade Levels:
EC, ES, MS, HS

Focal Populations:

Technology Developed/Studied:

Examining Effective Intervention Targets, Longitudinal Intensity, and Scaling Factors for Pre-K to 5th Grade Student Comprehension

Award # R305F100027 Christopher Lonigan, Florida State University

In this project, a part of the Reading for Understanding Research Initiative, researchers iteratively developed and studied reading interventions for students and instructional intervention for teachers. The reading interventions included various materials aimed to improve students' word knowledge, comprehension, and persistence. One intervention, WKe-Book, leveraged an electronic book with a choose-your-own-adverture format to engage students while collecting information about student interaction with the material (e.g., how quickly they read, whether they answered questions correctly). The intervention for teachers included CTT (Comprehension Tools for Teachers), a web-based instructional support suite of tools and professional development materials to help them identify children with or at risk for developing reading difficulties. CTT focused on helping teachers assist students improve their reading comprehension skills and was developed to be a multi-component instructional strategy that identified the causes of students' problems and helped teachers deploy, monitor, and adapt instructional strategies for identified students.

Grade Levels:
EC, ES

Focal Populations:

Technology Developed/Studied:

SmartSign: Learning Sign Language via Mobile Phone

Award # R324A100080 Thad Starner, Georgia Institute of Technology

In this project, researchers iteratively developed and studied an intervention for hearing parents of deaf children called SmartSign that aimed to improve deaf children's language development and educational outcomes by helping parents learn sign language. As part of the project, parents viewed video on mobile phones to learn sign language. The mobile phone program also delivered tips on grammar and culture, parent-deaf child interaction, and included local deaf events to introduce parents to deaf adults and other parents of deaf children.

Grade Levels:
EC, ES

Focal Populations:
SWD

Technology Developed/Studied:

Assessing ASL Knowledge and its Relationship to Reading English in Deaf Children

Award # R324A100176 Robert Hoffmeister, Boston University

In this project, researchers designed and validated a video-based assessment to be used by educators of deaf students (from prekindergarten to high school) to determine which students were on a normal language development path and which were above or below the expected ability level. The instrument, called the American Sign Language Assessment Instrument (ASLAI), consisted of a battery of computer-based assessments that measured students' knowledge of synonyms, antonyms, plurals, complex sentences, rare vocabulary, and narrative comprehension in sign language. The instrument was also developed to help educators identify deaf students who may have a language problem affecting their ability to learn to read.

Grade Levels:
EC, ES, MS, HS

Focal Populations:
SWD

Technology Developed/Studied:
✓

Using Developmental Science to Create a Computerized Preschool Language Assessment

Award # R305A110284 Roberta Golinkoff, University of Delaware

In this project, researchers designed and validated a computer-based language assessment for prekindergarten children intended to help teachers and providers become sensitized to children's language knowledge and to understand the importance of language growth. The computer-based language assessment automatically derived individual and group language profiles in vocabulary and word learning strategies, grammar, and the use of syntax in comprehension.

Grade Levels:
EC

Focal Populations:
EL

Technology Developed/Studied:
✓

Development of the School Readiness Curriculum Based Measurement System

Award # R305A110549

Jason Anthony, University of Texas, Houston, Health Science Center

In this project, researchers designed and validated the School Readiness Curriculum Based Measurement System (SR-CBMS), an assessment for prekindergarten children who were dual language learners. It was designed to identify children's strengths and weaknesses in English and Spanish, monitor students' learning, and inform instruction through a curriculum-based school readiness measure addressing language and literacy skills. Researchers used a software program to administer the test items to students.

Grade Levels:
EC

Focal Populations:
EL

Technology Developed/Studied:
✓

A Parent-Directed Multimedia Early Intervention Tool to Improve Outcomes in Underserved Children who are Deaf or Hard of Hearing

Award # R324A110122

Dana Suskind, University of Chicago

In this project, researchers iteratively developed and studied Project ASPIRE (Achieving Superior Parental Involvement for Rehabilitative Excellence), a provider-guided, multimedia intervention directed at parents of 12- to 36-month-old children who were deaf or hard of hearing and of low socio-economic status. It aimed to improve the children's educational success by enhancing parents' ability to support their children's listening and language development. Project ASPIRE was designed for early interventionists to use with parents. Parents would work through multimedia modules that incorporated animation and videos, learn how to transmit language and literacy knowledge and skills, and receive feedback about the child's language environment and development via a language processor worn by the child.

Grade Levels:
EC

Focal Populations:
SWD

Technology Developed/Studied:

The Effects of Online Decision Making Support for Home Visitors Using an RTI Approach to Promote the Language Development of At-risk Infants and Toddlers

Award # R324A120365 Jay Buzhardt, University of Kansas

In this project, researchers evaluated the impact of MOD: Making Online Decisions, a web-based system to support people who make home visits to families with children who may have disabilities related to language and early communication skills. The system helped home visitors identify children at risk for early language delay and to design, deliver, and maintain a parent-implemented intervention for promoting their child's early language development , using a response to intervention (RTI) approach.

Grade Levels:
EC

Focal Populations:
SWD

Technology Developed/Studied:

Enhancing Augmentative and Alternative Communication Rates in pre-K Through 6

Award # EDIES14C0043 Benjamin Grimley, Speak Agent

In this project, researchers iteratively developed and studied an intervention for prekindergarten- through sixth-grade students with special communication needs. The intervention aimed to improve student outcomes by using artificial intelligence software on touch-screen mobile devices. The product adapted prompts and cues to the needs of individual students.

Grade Levels:
EC, ES, MS

Focal Populations:
SWD

Technology Developed/Studied:

Individual Growth and Development Indicators: Automated Applications for Performance Evaluation of Early Literacy (IGDI-APEL)

Award # R305A140065 — Alisha Wackerle-Hollman, University of Minnesota

In this project, researchers iteratively developed and studied a tablet-based application (app) for prekindergarten children called the Individual Growth and Development Indicators: Automated Applications for Performance Evaluation of Early Literacy (IGDI-APEL) that aimed to improve children's literacy outcomes. The app was based on existing paper-and-pencil materials that included assessments for screening and identification of student needs. The final product was to include digital assessments as well as instructional components that, combined, could monitor students' progress in mastering components of early literacy and provide instructional suggestions to teachers.

Grade Levels:
EC

Focal Populations:
SWD

Technology Developed/Studied:

Coh-Metrix: Automated Cohesion and Coherence Scores to Predict Text Readability and Facilitate Comprehension

Award # R305G020018 — Danielle McNamara, University of Memphis

In this project, researchers iteratively developed and studied Coh-Metrix and Coh-GIT, tools for writers, editors, and educators to help them estimate the appropriateness of a text for their audience and to pinpoint specific problems with the text (e.g., constructions that might be difficult for readers). Writers could also use the tools to help them write more readable texts that both supported and challenged readers. The tools were developed for use by grade school and postsecondary students.

Grade Levels:
ES, PA

Focal Populations:

Technology Developed/Studied:

Reading to Learn: Investigating General and Domain Specific Supports in a Technology-Rich Environment with Diverse Readers Learning from Informational Text

Award # R305G020041 — Bridget Dalton, CAST, Inc.

In this project, researchers iteratively developed and studied an intervention for fourth-grade students that aimed to accelerate struggling readers' reading comprehension through a computer-based instructional learning environment. The learning environment included features such as text-to-speech decoding with synchronized highlighting of text and an embedded system of prompts, hints, and modeling.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Reader-Specific Lexical Practice for Improved Reading Comprehension

Award # R305G030123 James Callan, Carnegie Mellon University

In this project, researchers iteratively developed and tested a web-based search engine and intelligent tutoring system for university students and students in third- through sixth-grade that aimed to improve their reading comprehension and vocabulary growth. The students were to use the search engine to select passages on the Internet on topics of interest that also met specific standards of reading difficulty. As students used the search engine, it analyzed their behavior and developed a profile for each individual student's level of acquisition and fluency for each word, producing an individualized framework for selecting reading materials that strengthened that student's reading comprehension. The intelligent tutoring system, called REAP, provided reader-specific lexical practice for improved reading comphrension by selecting authentic reading materials from the Internet that were matched to students' needs.

Grade Levels:
ES, MS, PA

Focal Populations:

Technology Developed/Studied:

National Research Center on Rural Education Support

Award # R305A040056 Thomas W. Farmer, University of North Carolina, Chapel Hill

In this project, researchers evaluated the impact of multiple interventions across multiple grades (kindergarten through high school) to determine their effects on improving education in rural settings. One of the projects led by the National Research Center on Rural Education (NRCRES) developed a video distance professional development system on writing for K-1 teachers and another studied the impact of in-school facilitators for online advanced placement (AP) courses on student achievement.

Grade Levels:
ES, MS, HS

Focal Populations:

Technology Developed/Studied:

Improving Reading Comprehension for Struggling Readers: Understanding the Roles of Vocabulary Development, Guided Strategy Use, and Spanish Language Supports in a Digital Reading Environment

Award # R305G050029 Bridget Dalton, CAST, Inc.

In this project, researchers iteratively developed and studied an intervention for fifth-grade students who were struggling readers, including English learners. It aimed to improve students' reading comprehension through a digital reading environment called Universal Learning Edition (ULE). ULE embedded vocabulary and reading strategy instruction in interactive, scaffolded, digital versions of narrative and informational texts.

Grade Levels:
ES

Focal Populations:
EL

Technology Developed/Studied:

Assessing Readers Struggling to Comprehend Multiple Sources of Information

Award # R305G050091 Kimberly Lawless, University of Illinois, Chicago

In this project, researchers designed and validated a taxonomy of third- through fifth-grade elementary school science and social studies reading comprehension strategies and skills central to multiple text comprehension. They used the taxonmy to develop a set of computer-based assessments and indicators that differentiate among levels of proficiency and that would provide information for instructional decisionmaking.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

An Independently Usable Multimedia Software System in Listening Comprehension and Auditory Repetition Priming for Intellectually Disabled Non-Readers

Award # R305S050010 Steven Stock, AbleLink Technologies

In this project, researchers iteratively developed and studied an intelligent tutor software for K-12 students with intellectual disabilities that aimed to improve their independent functioning by improving their auditory recall skills. The software used a computer-generated avatar to deliver personalized tutorials with auditory repetition priming and assessments. Students learned on their own and at their own pace, thus enabling more efficient use of teacher time for overall class instruction. The intervention was also to include a web-based infrastructure for teachers to track progress.

Grade Levels:
ES, MS, HS

Focal Populations:
SWD

Technology Developed/Studied:

Using Television to Expand the Vocabulary of Beginning Readers

Award # R305S050042 Daniel Shanahan, Sirius Thinking, Ltd.

In this project, researchers iteratively developed and studied an intervention for kindergarten and first-grade children aimed to promote children's vocabulary development and later reading ability through educational television. As part of the project, researchers embedded vocabulary-building video segments in a popular children's educational television series called Between the Lions. Researchers also developed a computer-based version of the videos accompanied by interactive electronic storybooks and a linked animated dictionary.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Dynamic Offset of Text Highlighting to Build Reading Fluency

Award # ED06PO0904 Robert Berdan, Readingware

In this project, researchers iteratively adapted and tested an online e-book that provided audio-voiceovers for highlighted text in order to improve students' oral reading fluency.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

The Between the Lions Digital Den

Award # ED06PO0911 Daniel Shanahan, Sirius Thinking, Ltd.

In this project, researchers iteratively developed and studied the Between the Lions Digital Den, an intervention for kindergarten and first-grade English- and Spanish-speaking students aimed to improve students' literacy through computer-based software that had word games, songs, music videos, interactive stories, and an audio/visual dictionary.

Grade Levels:
ES

Focal Populations:
EL

Technology Developed/Studied:

National Accessible Reading Assessment Projects: Research and Development for Students with Visual Impairments

Award # R324A060034

Cara Cahal
an Laitusis, Educational Testing Service

In this project, researchers designed and validated computer-based assessments of reading proficiency. The goals of the project were two-fold. First, the researchers examined the psychometric properties of state tests administered to students with visual impairments. Second, they tested an accessible assessment of reading and an assessment of technology-assisted reading.

Grade Levels:
ES, MS, HS

Focal Populations:
SWD

Technology Developed/Studied:


Project ILIAD: Independent Lexical Instruction and Development

Award # R324L060023

Howard Goldstein, Florida State University

In this project, researchers iteratively developed and studied Project ILIAD, an intervention for kindergarten through third-grade students designed to prevent delays in reading, language, and academic development through automated supplemental vocabulary instruction. Children listened to stories and engaged in choral reading at "listening centers," which were equipped with a CD player and headphones. They also independently completed vocabulary or phonics worksheets and participated in teacher-led question-and-answer review sessions.

Grade Levels:
ES

Focal Populations:
SWD

Technology Developed/Studied:

4KW: A Multimedia System for Ensuring that Grade School Students Know the Meaning of the 4,000 Most Frequently Used English Words

Award # ED07CO0043

Gregory Sales, Seward Incorporated

In this project, researchers iteratively developed and studied 4KW, an intervention for first- through fourth-grade students with small vocabularies relative to their peers. It aimed to teach the meanings of the 4,000 most frequently used English words. As part of the project, an individualized web-based system assessed students and placed them in one of 10 steps (simpler to more complex words) based on their assessed vocabulary knowledge and provided instruction with the goal of mastering all 10 steps. An automated speech component recorded students' pronunciations, judged the accuracy of each student's pronunciation, and provided students with feedback.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:


Early ICARE: Early Independent Comprehensive Adaptive Reading Evaluation
Award # R305A070231
Barbara Wise, University of Colorado, Boulder

In this project, researchers designed and validated Early ICARE: Early Independent Comprehensive Adaptive Reading Evaluation, a computer-delivered reading assessment for native English speakers and English learners in grades K to 2 to identify their reading weakness. The assessment provided early screening, profiling, and dynamic periodic assessment of problems underlying poor reading comprehension in young children.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:


Explicit Comprehension Instruction in an Automated Reading Tutor that Listens
Award # R305B070458
Jack Mostow, Carnegie Mellon University

In this project, researchers iteratively developed and studied an automated reading tutor that taught reading comprehension strategies to students in grades 1 through 3 to improve their comprehension of narrative and informational text. The reading tutor provided students with an explicit description of a reading strategy, modeled how to use the strategy by displaying a written text and giving auditory instructions, provided practice opportunities, and monitored students' verbal responses.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:


CopyCat: Learning through Signing
Award # R324A070196
Thad Starner, Georgia Institute of Technology

In this project, researchers iteratively developed and studied CopyCat, an interactive educational game to enhance the expressive language, receptive language, working memory, and language processing skills of deaf and signing children of hearing parents. CopyCat was designed as a computer game for children to provide language models using gesture recognition technology to respond to children's signing. It progressively increased the difficulty of the signing tasks and provided corrective feedback.

Grade Levels:
ES, MS

Focal Populations:
SWD

Technology Developed/Studied:


Efficacy and Replication Research on the Intelligent Tutoring System for the Structure Strategy--Rural and Suburban Schools Grades 4, 5, 7, and 8

Award # R305A080133 — Kay Wijekumar, Pennsylvania State University

In this project, researchers evaluated the impact of a web-based, intelligent tutoring system for elementary and middle school students designed to improve their reading comprehension of informational texts. The web-based intelligent tutor, the Intelligent Tutoring System for the Structure Strategy (ITSS), taught students how to use the structure strategy, (a method that helps readers to focus on the text organization and to organize their reading accordingly) and provided them with feedback as they used the strategy.

Grade Levels:
ES, MS

Focal Populations:

Technology Developed/Studied:

Developing Vocabulary in an Automated Reading Tutor

Award # R305A080157 — Jack Mostow, Carnegie Mellon University

In this project, researchers iteratively developed and studied an intervention for children in grades 2 and 3 that aimed to improve their vocabularies through individual, automated tutoring. Children engaged with a computerized reading tutor that provided vocabulary instruction, used speech recognition to listen to children read aloud, and responded with spoken and graphical assistance.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Efficacy of Earobics Step I in English Language Learners and Low SES Minority Children

Award # R305A080196 — Jason Anthony, University of Texas, Houston, Health Science Center

In this project, researchers evaluated the impact of Earobics Step I, a computer-based literacy tutoring program to improve the literacy skills of low-income minority children and low-income English learners ages 4 to 7. The program delivered colorful, interactive games with instructional feedback to teach phonological awareness, phonological short-term memory, sound discrimination, and letter-sound correspondence.

Grade Levels:
ES

Focal Populations:
EL

Technology Developed/Studied:

Accelerating Fluency Development in an Automated Reading Tutor

Award # R305A080628 Jack Mostow, Carnegie Mellon University

In this project, researchers iteratively designed and tested an intervention for second- and third-grade students aimed to improve students' reading fluency through assessing their progress, adjusting the difficulty of the content according to their ability, and providing practice at intervals. As part of the project, students engaged with a computerized reading tutor that "listened" to them read aloud and provided auditory and graphical feedback based on effective human interventions.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Word-Learning Strategies: A Program for Upper Elementary Readers

Award # EDIES09C0013 Gregory Sales, Seward Incorporated

In this project, researchers iteratively developed and studied Word-Learning Strategies, an intervention for fourth- and fifth-grade students designed to increase their vocabulary knowledge through online tutorials, student activity books, and evaluations. The online tutorials focused on context, word parts, glossaries, and dictionary use.

Grade Levels:
ES

Focal Populations:
EL

Technology Developed/Studied:

Formative Assessment and Instrumentation Procedures for Reading

Award # R324A090038 Theodore Christ, University of Minnesota

In this project, researchers designed and validated the Formative Assessment and Instrumentation Procedures for Reading, a progress monitoring measure for first- through fifth-grade students. The assessment was designed to help teachers identify students at risk for reading difficulty by determining students' growth in rate of reading and comprehension skills. The Formative Assessment and Instrumentation Procedures for Reading also included online materials to help teachers interpret and use student data resulting from the assessments.

Grade Levels:
ES

Focal Populations:
SWD

Technology Developed/Studied:

Developing a More Effective Speech Therapy Distance Learning Web-Based Product and Service

Award # EDIES10P0011 — Jack Lynch, Presence Telecare, LLC

In this project, researchers iteratively developed and studied Presence Telecare, an intervention for students with speech or language delays and disorders. It aimed to improve accessibility to speech language support services through web-based video conferencing integrated with therapy and management tools that allowed remote data collection and communication with the student and their family.

Grade Levels:
ES, MS
Focal Populations:
SWD
Technology Developed/Studied:

Go Talk Phonics: Phonics for Individuals with Disabilities

Award # EDIES11C0027 — Carol Stanger, The Attainment Company, Inc.

In this project, researchers iteratively developed and studied Go Talk Phonics, a web-based phonics curriculum for low- and non-verbal students to help them communicate in academic and non-academic settings more fluidly. Go Talk Phonics aimed to improve their word learning, comprehension, and overall literacy. Animated voices modeled explicit phonics instruction for commonly used letter sounds and words. Pre-programmed modules supported students in manipulating phonemic elements. Go Talk Phonics also included a phonics curriculum and a professional development guide with an assessment rubric to facilitate teacher usage.

Grade Levels:
ES, MS, HS
Focal Populations:
SWD
Technology Developed/Studied:

MyASL Quizmaker

Award # EDIES11C0032 — Corrine Vinopol, Institute for Disabilities Research and Training, Inc.

In this project, researchers iteratively developed and studied an intervention for students with hearing impairments called My ASL Quizmaker. It aimed to improve measures of students' vocabulary knowledge and reading comprehension through web-based assessments that provided automatic American Sign Language graphic and video translations for students; enabled teachers to create customized tests, exams, and quizzes that were automatically scored; and provided teacher reports with grades and corrected quizzes.

Grade Levels:
ES, HS
Focal Populations:
SWD
Technology Developed/Studied:

Artificial Intelligence Software to Tutor Literary Braille to the Blind and Visually Impaired

Award # EDIES11C0034 Benny Johnson, Quantum Simulations, Inc.

In this project, researchers iteratively developed and studied the Artificial Intelligence Braille Tutor software to provide on-demand Braille literacy support to the visually impaired in kindergarten through 12th grade.

Grade Levels:
ES, MS, HS

Focal Populations:
SWD

Technology Developed/Studied:

Developing a Cross-Age Peer Tutoring Program to Promote the Vocabulary and Comprehension of English Learners

Award # R305A110142 Rebecca Silverman, University of Maryland, College Park

In this project, researchers iteratively developed and studied an intervention for English learners (ELs) in kindergarten and fourth grade to support their vocabulary and comprehension development. The intervention used cross-age peer tutoring, in which older and younger children worked together. Teachers received a study group guide with information on vocabulary, comprehension, accommodations for ELs and engaged in cooperative learning that included a DVD with examples and tips for program implementation.

Grade Levels:
ES

Focal Populations:
EL

Technology Developed/Studied:

Burst: Reading Efficacy Study

Award # R305A120811 Brian Rowan, University of Michigan

In this project, researchers evaluated the impact of Burst Reading, a software-based intervention for kindergarten through third-grade teachers to improve students' literacy skills by repeatedly assessing and scoring students' reading ability and providing teachers with aligned instructional content. Teachers used handheld devices to administer reading assessments individually to students. The resulting formative assessment data allowed teachers to make data-driven, in-the-moment instructional decisions at both the individual and classroom levels.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Research on and with Novel Educational Technologies for Comprehension

Award # R305G020027

Thomas Landauer, University of Colorado, Boulder

In this project, researchers developed and studied computer-based instructional activities for middle school, high school, and college students to help them acquire larger vocabularies to support high-level comprehension.

Grade Levels:
MS, HS, PA

Focal Populations:

Technology Developed/Studied:

Computer Based Assessment System for Reading (CBAS-R): Skills Analysis and Progress Monitoring

Award # R305A120086

Theodore Christ, University of Minnesota

In this project, researchers further designed and validated an existing computer-based reading assessment for kindergarten through fifth-grade students. The existing assessment, the Computer-Based Assessment System for Reading (CBAS-R), was designed to monitor student progress, evaluate their strengths and weaknesses in reading, and gauge the effects of instruction. The revisions to CBAS-R focused on assessing both broad and component reading skills such as concepts of print, phonological skills, fluency, phonics, vocabulary, and comprehension and generated assessment score reports for teachers.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Improving Reading Comprehension of Middle Grades English Language Learners by Combining Structure Strategy with Web-Based Adaptive Tutoring for EL Learners (SWELL)

Award # R305A120593

Kausalai Wijekumar, Pennsylvania State University

In this project, researchers iteratively adapted and tested an existing web-based intelligent tutoring system for fourth- through sixth-grade Spanish-speaking English learners. The existing system, the Intelligent Tutoring using Structure Strategy (ITSS), was designed to teach students explicit strategies for using knowledge of the structure of informational text to improve understanding. The revised system aimed to support Spanish-speaking English learners by providing additional materials in Spanish or in simplified versions of the English materials depending on students' English proficiency; as students' English proficiency improved, it removed these supports.

Grade Levels:
ES, MS

Focal Populations:
EL

Technology Developed/Studied:

Reducing Special Education/Reading Risk for Urban Learners through an Oral Reading Fluency Intervention

Award # R324A120103 Gwendolyn Cartledge, Ohio State University

In this project, researchers iteratively developed and studied an intervention for urban first- and second-grade students with disabilities that aimed to increase their oral reading fluency through a computer-based program. The program was to deliver individualized instruction through voice-activated software and guided students through reading passages by modeling and correcting oral reading and by administering pre- and post-lesson assessments. The program included culturally relevant passages that reflected the interests and backgrounds of students from urban settings.

Grade Levels:
ES

Focal Populations:
SWD

Technology Developed/Studied:

Readorium Rising Reader: Smart Nonfiction Comprehension Software for Students in Grades 3-5

Award # EDIES13C0030 Harriet Isecke, Mtelegence Corporation

In this project, researchers iteratively developed and studied a prototype of Readorium Rising Reader, a web-based game for third- through fifth-grade students to strengthen their reading comprehension of non-fiction science text by teaching strategies to construct meaning and decipher new content vocabulary.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

World Explorador

Award # EDIES13C0040 Lynn Krause, CurriculaWorks

In this project, researchers iteratively developed and studied a prototype of World Explorador, an intervention for English learners to promote their basic English language and literacy skills through a game-based, mobile application with interactive activities that students used to practice specific skills.

Grade Levels:
ES

Focal Populations:
EL

Technology Developed/Studied:

Development of a Web-Based Writing Partner (Strategic Writing Assisted by Intelligent Tutoring for Fifth-Grade Youth (SWAY)) to Improve Writing Persuasive Essays for 5th Grade Students

Award # R305A130705 Kausalai Wijekumar, Texas A & M University

In this project, researchers iteratively developed and studied Strategic Writing Assisted by intelligent tutoring for fifth-grade Youth (SWAY), an intervention for fifth-grade students to help them write logical, compelling, and coherent persuasive essays. SWAY was designed to be an intelligent web-based tutor and writing tool for learning content material. The web-based tutor provided students with modeling, practice, assessment, and feedback in the content areas of science and social studies. The intervention included a teacher implementation package with instructions, lesson plans, suggestions for coordinating peer feedback, and suggestions for integrating lessons into the curriculum.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

BLOOM: Facilitating Language and Literacy Outcomes of English Language Learners

Award # R305A130460 Carla Jackson, Florida State University

In this project, researchers iteratively developed and studied an intervention for English learners in kindergarten and first grade. The intervention, Bridging for Language Outcomes in the Classroom (BLOOM), was designed to enhance students' reading comprehension and academic achievement by linking their knowledge of Spanish to new words in English. As part of the project, students read e-books that provided vocabulary instruction including preview and review, repeated Spanish expansions, and leveraged students' knowledge of phonemics in both languages.

Grade Levels:
ES

Focal Populations:
EL

Technology Developed/Studied:

Commercializing the Effective K-3 Assessment to Instruction (A2i) Intervention to Reduce Cost and to Scale Access to the Benefit of More Students

Award # EDIES14C0026 Jay Connor, Learning Ovations

In this project, researchers iteratively adapted and tested an intervention for kindergarten- through third-grade students. The existing intervention, Assessment-to-instruction (A2i) was a tool to support individualized literacy instruction across school districts. During this project, the researchers created a more cost-efficient, scalable version of the tool that reduced researcher support and local district adaptation costs.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Technology-Enhanced Tutoring: Linking School and Home to Help Struggling Readers
Award # EDIES14C0046 Christopher Cerf, Sirius Thinking, Ltd.

In this project, researchers iteratively developed and studied a prototype of Lightning Squad: Powered-Up Reading with Teams, an intervention for first- to third-grade students that provided additional reading support through a web-based tutoring tool used by paraprofessionals. The tutoring tool supplemented the Success for All whole-school reading program with video segments and gaming content. The product included teacher resources and curriculum suggestions to facilitate classroom integration.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Teaching the Vocabulary of Comprehension: A Technology-Enhanced System to Enhance At-Risk Third Graders' Acquisition and Application of Essential Vocabulary
Award # R305A140090 Deborah C. Simmons, Texas A&M University

In this project, researchers iteratively developed and studied a computer-based learning system for at-risk third-grade students to build their knowledge and application of vocabulary associated with narrative and informational text, text structure, and text processing. The software, called the Integrated Vocabulary of Comprehension System, was to provide students with individual instruction and practice along with immediate feedback to support students as they applied reading comprehension strategies.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Multiple-choice Online Cloze Comprehension Assessment (MOCCA): Refining and Validating a Measure of Individual Differences in Reading Comprehension Processes During Reading
Award # R305A140185 Gina Biancarosa, University of Oregon

In this project, researchers further designed and validated an existing assessment, the Multiple-choice Online Cloze Comprehension Assessment (MOCCA). MOOCA was a paper-and-pencil assessment to diagnose specific types of poor comprehension with third- through fifth-grade students. Researchers increased the number of test items, validated them, and designed a computer-based version of the assessment.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Measuring Oral Reading Fluency: Computerized Oral Reading Evaluation (CORE)
Award # R305A140203
Joseph Nese, University of Oregon

In this project, researchers designed and validated Computerized Oral Reading Evaluation (CORE), an assessment for second- through fourth-grade students. CORE was designed to assess students' oral reading fluency through a computerized assessment that used speech recognition technology. Students logged into the assessment system and read passages aloud using headphones with a noise-cancelling microphone attached. The assessment system scored each word for response accuracy and response time.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:


English Learner Vocabulary Acquisition (ELVA): Promoting the Vocabulary and Language Proficiency of Spanish Speaking English Learners in Second Grade
Award # R305A140471
Doris Luft de Baker, Southern Methodist University

In this project, researchers iteratively developed and studied English Learner Vocabulary Acquisition (ELVA), an intelligent tutoring system for Spanish-speaking English learners (ELs) to improve their vocabulary knowledge, text comprehension, and English language proficiency. The tutor read books aloud that contained target vocabulary words and then engaged EL students in a dialogue around the content of the book. Students worked through activities designed to facilitate deep learning of the target words, their associated concepts, and linguistic meaning with the tutor's guidance.

Grade Levels:
ES

Focal Populations:
EL

Technology Developed/Studied:


Intelligent Tutoring Using the Structure Strategy to Improve Reading Comprehension of Middle School Students
Award # R305G030072
Bonnie Meyer, Pennsylvania State University

In this project, researchers iteratively developed and studied a web-based intelligent tutor for middle school students that aimed to teach struggling readers how to use the structure of the text to help them understand what they are reading. The web-based tutor taught students to recognize common organizational structures used in expository texts and how to use those structures to help them identify the main ideas in expository texts.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:


Assessment of Comprehension Skills in Older Struggling Readers

Award # R305G050083 Gloria Waters, Boston University

In this project, researchers designed and validated a comprehensive, computerized language assessment battery for middle and high school teachers to help their students become better readers. Teachers used the assessment to identify comprehension skills that particular students lacked, to target deficiencies in focused remediation, and to assess whether the subcomponents of reading were becoming more accurate, efficient, and automatic with instruction.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:


Developing Internet Comprehension Strategies among Adolescent Students At Risk to Become Dropouts

Award # R305G050154 Donald Leu, University of Connecticut

In this project, researchers iteratively developed and tested Internet Reciprocal Teaching (IRT), an intervention for poor, minority youth that aimed to help them acquire online reading comprehension skills and enhance their academic achievement through an adapted version of reciprocal teaching (i.e., when students lead small group reading sessions after watching a teacher model the behavior and while getting support from the teacher). The adaptations researchers with IRT made to traditional reciprocal teaching included specific instruction about unique strategies used to locate, evaluate, synthesize, and communicate information on the Internet.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:


Rocket Reader: A Simplified PDA-based Portable Reading System for Enabling Access to Audio Books and Electronic Documents for Individuals with Intellectual Disabilities

Award # R305S050070 Daniel Davies, AbleLink Technologies

In this project, researchers iteratively adapted and tested Rocket Reader, a desktop and palmtop software platform for blind or visually impaired middle school students. Rocket Reader was designed to help students access electronic materials in a variety of formats, including audio books, text documents, and documents, more easily.

Grade Levels:
MS

Focal Populations:
SWD

Technology Developed/Studied:

Explicit Scaffolding for Word Learning in Context through Multimedia Word Annotation
Award # R305A080596 Judith Scott, University of California, Santa Cruz

In this project, researchers iteratively designed and tested an intelligent computer system for middle school students who struggled with reading. It was designed to improve students' word learning by determining which words were likely unknown to the reader and automatically generating appropriate pictures, pronunciation keys, and dictionary entries.

Grade Levels:
MS

Focal Populations:
EL

Technology Developed/Studied:

Capitalizing on Social Networking: Social Networking Practices to Increase Adolescent Literacy Engagement **and Achievement**
Award # EDIES09C0018 Dave Miller, Knowledge Athletes

In this project, researchers iteratively developed and studied a commercially viable social media web application. The application aimed to enable teachers to lead online classroom dialogs and to increase student engagement through an integrated set of digital technologies. Researchers gathered feedback from grade 8 and 11 language arts classroom students and teachers to assess how the technology altered students' work, engagement, and self-confidence in literacy and writing. The team also developed an online resource to train and support teachers using the product.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

The ESTRELLAS Project: Electronic Supported Text Research for English Language Learner Academic Success
Award # R305A090227 Lynne Anderson-Inman, University of Oregon

In this project, researchers iteratively designed and tested the ESTRELLAS Electronic Reading System for Expository Text, an intervention for Spanish-speaking middle school students to improve their reading competency in English. As part of the project, students engaged with an electronic reading system that facilitated students' progress through electronic texts, fostered motivation for reading, scaffolded key concepts within the texts, and provided English definitions, Spanish translations, and enhanced illustrations.

Grade Levels:
MS

Focal Populations:
EL

Technology Developed/Studied:

The Assess-as-You-Go Writing Assistant: A Student Work Environment that Brings Together Formative and Summative Assessment

Award # R305A090394

William Cope, University of Illinois, Urbana-Champaign

In this project, researchers iteratively designed and tested the Assess-As-You-Go Writing Assistant, an intervention for eighth-grade students to improve their writing performance and writing assessments by providing constant feedback and formative assessments. The Writing Assistant used a combination of tagging, social networking, and natural language processing technologies. As part of the intervention, students participated in a web-based learning environment where they created written texts and received ongoing feedback from a computerized writing assistant as well as from teachers, peers, and experts using social networking and tagging technology.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

STEPS to Literacy: An Integrated Digital Writing Space for English Language Learners

Award # R305A090476

JoAnne Kleifgen, Columbia University, Teachers College

In this project, researchers iteratively designed and tested STEPS to Literacy, an intervention for Latino English learners in middle school to support academic writing in English through writing tools, multimodal resources, and writing activities. As part of the intervention, students accessed web-based writing instruction that guided them in an exploration of the world through the lenses of science, technology, and social studies.

Grade Levels:
MS

Focal Populations:
EL

Technology Developed/Studied:

Assessing Online Reading Comprehension: The ORCA Project

Award # R305A090608

Donald Leu, University of Connecticut

In this project, researchers designed and validated assessments of online reading comprehension for seventh-grade students. As part of the intervention, researchers created the Online Reading Comprehension Assessment (ORCA), which allowed teachers and administrators to assess whether students were acquiring the skills necessary for online reading comprehension.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Assessment of Comprehension in Older Struggling Readers

Award # R305A100261 Gloria Waters, Boston University

In this project, researchers further designed and validated an assessment for middle and high school students to improve their literacy skills. This project expanded a test battery originally developed for high school students to include middle school students. The revised battery integrated more items and was intended to measure middle through high school students' ability to process written and spoken language.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

Reading for Understanding Across Grades 6 through 12: Evidence-Based Argumentation for Disciplinary Learning

Award # R305F100007 Susan Goldman, University of Illinois, Urbana-Champaign

In this project, a part of the Reading for Understanding Research Initiative, researchers iteratively developed and studied an intervention for middle and high school students to enhance students' reading comprehension through a model that captured complex critical analysis processes while attending to the psychological and social challenges of adolescence. As part of the project, students used SenseMaker, a software tool that provided workspaces for individul or colloborative work. SenseMaker was developed to help students interpret tasks, activate prior knowledge, and construct knowledge to facilitate evidence-based argumentation.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

Understanding Malleable Cognitive Processes and Integrated Comprehension Interventions for Grades 7–12

Award # R305F100013 Sharon Vaughn, University of Texas, Austin

In this project, a part of the Reading for Understanding Research Initiative, researchers explored motivation and engagement for reading, cognitive processing, and reading comprehension with students with and without reading comprehension difficulties. The researchers used the results from this work to develop and test Comprehension Circuit Training (CCT), a new intervention designed to leverage motivation and improve the comprehension skills of struggling readers. CCT was delivered via iPad to students and included activities for both narrative and expository text.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

Project SAIL: Strategies for Academic Internet Learning
Award # R324A100322
Lynne Anderson-Inman, University of Oregon

In this project, researchers iteratively developed and studied an intervention for middle and high school students with learning disabilities to improve their online reading skills. The intervention included online interactive teaching modules that illustrated step-by-step strategies students could use when reading and learning online.

Grade Levels:
MS, HS

Focal Populations:
SWD

Technology Developed/Studied:

u-learn.net: An Anywhere/Anytime Formative Assessment and Learning Feedback Environment
Award # EDIES11C0019
Bill Cope, Common Ground Publishing, LLC

In this project, researchers iteratively developed and studied Scholar, an intervention to improve student writing performance and the usefulness of writing assessments. Scholar was designed to be an online tool that had a wide range of multimodal texts such as scientific reports, writing in language arts, history essays, and social studies projects. It gave learners constant feedback in the form of on-demand formative assessment.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

Readorium Software for Improved Reading Comprehension of Non-fiction Science Text
Award # EDIES11C0042
Harriet Isicke, Mtelegence Corporation

In this project, researchers iteratively developed and studied Readorium, a web-based software to support struggling middle school readers' understanding of nonfiction science texts. The prototype of this software was developed under an earlier IES award. Readorium was designed to supplement middle school science curricula and included an in-take assessment, game-like components, and an avatar that explained all functions and guided student learning.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Creating Compositions Using a Technology-based Writing Tool: Supporting Students with Universal Design for Learning

Award # R305A110333 Tracey Hall, CAST, Inc.

In this project, researchers iteratively designed and tested Composition Builder, a web-based writing environment for middle school students that aimed to improve students' persuasive and expository writing competence. Composition Builder provided an interactive workspace that integrated writing instruction strategies with embedded writing tools and supports, such as concept mapping for planning, virtual writing strategy coaches, and opportunities for teacher and peer feedback.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Infowriter: A Student Feedback and Formative Assessment Environment for Writing Information and Explanatory Texts

Award # EDIES13C0039 Bill Cope, Common Ground Publishing, LLC

In this project, researchers iteratively developed and tested InfoWriter, an intervention for middle and high school students to improve their writing of informational and explanatory texts. InfoWriter included a web-based concept mapping tool and writing environment that teachers could use to supplement traditional writing assignments and to provide feedback to students.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

Comprehensive Research-based Computer Assessment and Accommodation System for ELL Students

Award # R305A130223 Jamal Abedi, University of California, Davis

In this project, researchers designed and validated a computer-based math assessment and language-accommodation system for English learners in middle school. The assessment was designed to help gather evidence of math knowledge for English learners who may underperform due to language barriers, not lack of math skills. The accommodations tested in the research project included (1) linguistically modified version of the math test, (2) bilingual versions of the test (native language assessment), (3) English glossary, (4) bilingual glossary, and (5) read-aloud test items.

Grade Levels:
MS

Focal Populations:
EL

Technology Developed/Studied:

Access: Language Arts

Award # EDIES14C0018 Carol Stanger, The Attainment Company, Inc.

In this project, researchers iteratively developed and studied Access: Language Arts II, a tablet-based software for middle school students with severe intellectual disabilities and autism. Access: Language Arts II was designed to improve students' language arts skills by having them listen to nonfiction stories read aloud while reading along with individual words highlighted on the tablet. Stories included symbol supports, vocabulary instruction with in-text definitions, and comprehension questions. Adaptive instruction and tablet data feedback were incorporated to provide individualized instruction with emphasis on vocabulary, communication, comprehension, critical thinking, research, and writing.

Grade Levels:
MS

Focal Populations:
SWD

Technology Developed/Studied:

The Iowa Assessment of Skills and Knowledge for Automatic Word Recognition and Decoding (iASK)

Award # EDIES14C0042 Carolyn Brown, Foundations in Learning

In this project, researchers iteratively developed and studied iASK, a web-based assessment program for middle school students with poor reading skills. iAsk was designed to assess decoding, fluency, and word recognition and generate formative assessment profiles of individual students for teachers to provide targeted instruction.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Automated, Personalized Formative Feedback for Student Writing with the LightSide Revision Assistant

Award # EDIES14C0045 Elijah Mayfield, Lightside Labs, Inc.

In this project, researchers iteratively developed and studied a prototype of LightSide Revision Assistant, a web-based writing program for students in sixth through eighth grade. Students wrote essays in the program and received instant and automatic feedback, including in-line comments, as part of an automated essay scoring system.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Improving Students' Comprehension and Construction of Arguments

Award # R305H020039 M. Anne Britt, Northern Illinois University

In this project, researchers iteratively developed and studied a simple web-based tutoring system for 12th-grade students that aimed to teach them to better comprehend and produce written arguments.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

iSTART: Interactive Strategy Trainer for Active Reading and Thinking

Award # R305G040046 Danielle McNamara, University of Memphis

In this project, researchers iteratively adapted and tested an automated reading strategy called iSTART. iSTART was developed to improve high school students' ability to understand and learn from complex written material by teaching them self-explanation and reading strategies such as monitoring comprehension, making bridging inferences, and using prior knowledge and logic to understand the text and by having them interact with pedagogical agents (animated characters used in online learning) to increased their active processing and participation as the system evaluated their self-explanations and provided feedback.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Creating a Usable Environment to Teach Argument Comprehension and Production Skills

Award # R305H050133 M. Anne Britt, Northern Illinois University

In this project, researchers iteratively developed and studied computer-based instructional modules for high school and college students that aimed to increase their ability to comprehend and write arguments. The modules were available online as stand-alone lessons and as a course presented in the context of a simple role-playing game.

Grade Levels:
HS, PA

Focal Populations:

Technology Developed/Studied:

The Writing Pal: An Intelligent Tutoring System that Provides Interactive Writing Strategy Training

Award # R305A080589 Danielle McNamara, University of Memphis

In this project, researchers iteratively designed and tested The Writing Pal, an intervention for high school students to improve their writing ability through writing strategy instruction and writing skill development. The Writing Pal was designed to include a computer-based intelligent tutor that led students through lessons about prewriting (free-writing and essay planning), drafting (generating an introduction and conclusion), and reviewing (evaluating how well the essay meets the assignment's requirements) and then through the writing of complete compositions.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Project LIBERATE (Literacy Instruction Based on Evidence through Research for Adjudicated Teens to Excel)

Award # R324A080006 David Houchins, Georgia State University

In this project, researchers designed and validated a reading intervention for incarcerated students with or at risk for disabilities residing in a juvenile justice facility. The final intervention incorporated the Scholastic READ 180 program with other supplemental computer-based literacy programs and teacher-delivered lessons. The final computer software assessed each student's skills and progress to deliver the right level of assistance and used audiobooks to target comprehension and independent reading.

Grade Levels:
HS

Focal Populations:
SWD

Technology Developed/Studied:

Intelligent Scaffolding for Peer Reviews of Writing

Award # R305A120370 Diane Litman, University of Pittsburgh

In this project, researchers iteratively adapted and tested Scaffolded Writing and Rewriting in the Disciplines (SWoRD), a software-based writing intervention for high school through college students. SWoRD was designed to improve students' writing by providing them with a platform to write compositions and reports and by facilitating the logistics of conducting peer review and making revisions to student work. The tool distributed student essays to reviewers, recorded their feedback, and returned it to the appropriate authors, who used this information to revise their work.

Grade Levels:
HS, PA

Focal Populations:

Technology Developed/Studied:

Exploration of Automated Writing Strategy Instruction for Adolescent Writings Using the Writing Pal

Award # R305A120707 Danielle McNamara, Arizona State University

In this project, researchers explored how components of a writing intervention were related to high school students' writing strategy acquisition and writing proficiency. The Writing Pal intervention used education technology to deliver writing strategy instruction, game-based writing practice, essay writing practice, and formative feedback to students. Researchers tested the effects of various formats or features of the intervention, including whether animated video lessons were more effective than illustrated instructional texts.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Exploring the Educational Game Landscape through Focused Studies and Ecological Interventions

Award # R305A130124 Danielle McNamara, Arizona State University

In this project, researchers explored how individual differences among high school students (e.g., motivation, engagement, persistence, prior knowledge) interacted with educational game designs. The researchers intended to use this information to improve the design of learning environments so that they maintain the attention of struggling students as they learned and mastered comprehension skills. Researchers used components of Interactive Strategy Training for Active Reading and Thinking-Motivationally Enhanced (iSTART-ME), an existing game-based intelligent tutoring system, to explore a range of potentially malleable factors that could be used to improve student outcomes. The intelligent tutoring system was comprised of a suite of educational games and game elements that were designed to improve students' comprehension skills and motivation to practice.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Developing an Online Tutor to Accelerate High School Vocabulary Learning

Award # R305A130467 Suzanne Adlof, University of South Carolina

In this project, researchers iteratively developed and studied DictionarySquared, a web-based vocabulary tutor for high school students to improve their vocabulary skill. DictionarySquared was designed to adapt to student knowledge, present new words in contexts that were rated as helpful and authentic, encourage active processing and student engagement, and assess student learning with reliable pre- and post-tests.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Assessing Reading Comprehension with Verbal Protocols and Latent Semantic Analysis

Award # R305G040055 Joseph Magliano, Northern Illinois University

In this project, researchers iteratively designed and validated an automated on-line reading strategy assessment tool called the Reading Strategy Assessment Tool (R-SAT) for use with college freshman and sophomores. The online reading assessment assessed the level of coherence and reading strategies students employed and measured students' comprehension during reading. It was to be integrated into an existing reading software, iSTART.

Grade Levels:
PA

Focal Populations:

Technology Developed/Studied:

Center for the Study of Adult Literacy (CSAL): Developing Instructional Approaches Suited to the Cognitive and Motivational Needs of Struggling Adults

Award # R305C120001 Daphne Greenberg, Georgia State University

In this project, researchers explored the underlying cognitive and motivational processes that help or hurt struggling adult readers improve their literacy skills, and they used this information to guide the development of a reading intervention for use with adult struggling readers. The intervention included a teacher-led component with classroom activities along with a web-based animated tutor component, called AutoTutor, that focused on reading comphrension skills.

Grade Levels:
PA

Focal Populations:

Technology Developed/Studied:

4. Other Academic Content Areas

This chapter includes Institute-funded research on technologies that support and improve student learning in academic content areas other than math and science or reading, writing, and language development. For example, technology has enhanced instruction in civics, social studies, geography, and history through access to primary data sources, publication and presentation software, virtual field trips, and online assessments (Taylor and Duran 2006).

Table Key

Grade levels:

EC	Early Childhood	HS	High School
ES	Elementary School	PA	Postsecondary and Adult Education
MS	Middle School		

Focal populations:

EL	English Learners
SWD	Students With Disabilities

Products developed or studied:


The spider web icon denotes **web-based** technology developed or studied.


The viewer icon denotes **virtual environment / interactive simulation** developed or studied.


The tutor icon denotes **intelligent tutor / artificial intelligence** technology developed or studied.


The chess piece icon denotes **game-based** technology developed or studied.


The checkmark icon denotes an **assessment** developed, validated, or studied.

For more information about these projects and publications stemming from them, please follow the hyperlinked award number to the online abstract on the Institute's website.

Give Me 5 for Children

Award # ED06PO0906 — Dee Peterson, Interactive Training Technologies

In this project, researchers iteratively developed and studied a web-based training program focused on influencing healthy food choices for students ages five to eight and their families. It aimed to improve nutrition and prevent childhood obesity and accompanying chronic diseases.

Grade Levels:
ES

Focal Populations:
EL

Technology Developed/Studied:

A National PBS Television & Interactive New Technology Program for Children 7-11

Award # ED06PO0936 — Natasha Rogoff, Kids Cook

In this project, researchers iteratively developed and studied a prototype of KidsCOOK, an intervention for students ages 7 to 10 that aimed to stem childhood obesity and connected chronic diseases through a web-based video, podcasts, and game-based tools that focused on nutrition, health, obesity and cooking education.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

OPEN's Virtual National Parks 3D Learning Environment for Science and Social Studies: Low-Cost and Easy to Implement Curriculums

Award # EDIES10C0020 — George Newman, One Planet Education Network

In this project, researchers iteratively developed and studied a virtual learning environment for science and social studies. The project team developed a three-dimensional (3D) virtual replica of Machu Picchu national park and the ancient Incan ruins in Peru. The online environment was designed for classroom use and was intended to foster engagement in learning and enhance gains in a set of multidisciplinary student outcomes.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Online Socratic Learning for Enhanced Critical Thinking

Award # EDIES10P0101 Scott Brewster, Triad Digital Media

In this project, researchers iteratively developed and studied a prototype of Online Socratic Learning for Enhanced Critical Thinking, an intervention for fifth-grade social studies students to increase their critical thinking and argument skills. Online Socratic Learning for Enhanced Critical Thinking was designed to be a web-based software that posed a hypothetical situation through a case study, asked students to create an argument to support the position, and then automatically proposed a counter-argument.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Mission US: An Interactive Solution for Middle School History Learning

Award #EDIES13C0027 David Langendoen, Electric Funstuff

In this project, researchers iteratively developed and studied Mission US, an intervention for fifth- through eighth-graders to increase their knowledge of American history and the Great Depression. The intervention used game-based technology with a tablet application that contained story-based missions, writing tools, interactive maps, and tips and hints to increase students' subject knowledge. The final product was to include additional updates to existing story-based missions and in-game assessment opportunities.

Grade Levels:
ES, MS

Focal Populations:

Technology Developed/Studied:

Integrated System for Teaching and Assessing Online Information Research

Award # EDIES13C0035 Kirill Kiryev, Instagrok Inc.

In this project, researchers iteratively developed and studied a prototype of a web-based tool to guide social studies and science students in grades 4 through 12 through conducting research on the Internet.

Grade Levels:
ES, MS, HS

Focal Populations:

Technology Developed/Studied:

GoGames Civics: Meeting Common Core Standards with Tablet-Enhanced Multiplayer Role Play Games

Award # EDIES13C0042 — Beth Quinn, Filament Games

In this project, researchers iteratively developed and studied GoGames Civics, a game-based tablet application to improve middle school students' civics subject matter knowledge. The prototype of this software was developed under an earlier IES award. GoGames Civics allowed students to roll play traditional civics through activities such as mock trials and congressional hearings. The tool provided students with new social identities and facilitated interactions, teamwork, collaboration, and discussion.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Youth Map: A Software Based Program to Increase Service-Learning Quality

Award # ED07CO0046 — Lewis Friedland, Community Knowledgebase, LLC

In this project, researchers iteratively developed and studied the impact of Youth Map, an intervention to improve high school service-learning curricula. Youth Map used a web-based geographic mapping software to help students create network maps that visually depicted, organized, and analyzed data. Youth Map also included a Geographic Information Systems (GIS) module, a teacher training guide and online support materials, and ecology and government modules to be taught in 2 to 3 weeks.

School Views (VIEWS): Volunteer, Internship, and Employment Web Solutions

Award # EDIES10P0110 — James Hohorst, Student Employment Software

In this project, researchers iteratively developed and studied a prototype of Volunteer, Employment, and Internship Web Solutions (VIEWS), an intervention to provide students with information about employment, volunteer, and internship opportunities through a web-based service.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

The American War: Featuring Valley Sim
Award # EDIES12C0034

Christian Speilvogel, Flip Learning

In this project, researchers iteratively developed and studied a prototype of The American War: Featuring Valley Sim, an intervention for college students. It aimed to improve their history knowledge through an American Civil War e-textbook that integrated thematic content, role-playing, games, and simulations to supplement classroom learning. Students used a software tool to recreate and critique arguments and events from various Civil War party perspectives.

Grade Levels:
PA

Focal Populations:

Technology Developed/Studied:

5. Social and Behavioral Outcomes

This chapter includes Institute-funded research on technologies that support and improve student social skills and behavioral outcomes, such as interactive social tutoring systems, a student self-management system, and virtual learning environments that support social competence. A sizable body of research supports the importance of social and behavioral skills as predictors of academic achievement. A recent meta-analysis also showed that social-behavioral interventions can be effective in promoting academic outcomes in addition to the targeted social skills and behavioral outcomes (Durlak et al. 2011). Other research has focused on developing and studying technology-based tools and interventions to help students develop social competence and social skills to support success in school (Louys et al. 2009). Through computer-mediated communication, students are provided social supports (Eden and Heiman 2011) and social cues (Han and Johnson 2012) that support social bonding, collaboration, and student engagement (Han and Johnson 2012; Henrie, Halverson, and Graham 2015).

Table Key

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Early Intervention for Young Children with ADHD: Developing Strategies to Enhance Parent Engagement

Award # R324A120284 George DuPaul, Lehigh University

In this project, researchers iteratively developed and studied a parent education program for parents with children ages 3 to 6 withattention deficit hyperactivity disorder (ADHD). The intervention aimed to increase parent engagement by targeting areas that are specifically problematic for young children with symptoms of ADHD: poor parent-child interactions, difficulty with pre-academic skills, and a high injury rate. The intervention was first implemented through weekly in-person sessions and then converted to a web-based format that maintained elements of the face-to-face program but enhanced parent engagement through multimedia and interactive activities.

Grade Levels:
EC, ES

Focal Populations:
SWD

Technology Developed/Studied:

Dynamic Narrative Generation Software to Improve Social and Behavioral School Readiness Skills Needed for the Successful Transition to Grade School

Award # EDIES13C0034 Melissa DeRosier, 3-C Institute for Social Development

In this project, researchers iteratively developed and studied a prototype of a web-based intervention for prekindergarten and kindergarten students. The intervention aimed to prepare students for the transition into grade school. The software supported students as they created stories using a step-by-step, scripted, interactive process. The stories focused on skills that were related to school readiness, such as self-regulation, positive behaviors with peers, positive classroom behaviors, and emerging independence.

Grade Levels:
EC, ES

Focal Populations:

Technology Developed/Studied:

Digitizing the K-8 Portion of the Positive Action Program for Web-Delivery

Award # ED06PO0910 Carol Allred, Positive Action, Inc.

In this project, researchers iteratively developed and studied a prototype of a web-based platform for implementing Positive Action, a K–12 program to promote students' character development, academic achievement, and social-emotional skills and to reduce disruptive and problem behavior.

Grade Levels:
ES, MS, HS

Focal Populations:

Technology Developed/Studied:

Development of an Intervention to Enhance the Social Competencies of Children with Asperger's/High Functioning Autism Spectrum Disorders

Award # R324A080136

Martin Volker, State University of New York (SUNY), Buffalo

In this project, researchers iteratively adapted and tested a summer intervention for students with high-functioning autism spectrum disorders (ASD) for use in a school-based setting via computer-aided delivery. The original intervention was developed to address children's cognitive, communicative, social, and behavioral needs through instruction in four core components: intensive social skills instruction, face and emotion recognition, interest expansion, and interpretation of non-literal language and idioms. The resulting school-based intervention also included parent training and school-based consultation.

Grade Levels:
ES, MS

Focal Populations:
SWD

Technology Developed/Studied:

Social Tele-Coaching in Classroom Settings

Award # R324A090322

Earle Knowlton, University of Kansas

In this project, researchers iteratively developed and studied Social Tele-Coaching, a remote-delivery, social skills coaching intervention for rural elementary and secondary students with disabilities. The intervention added direct, daily behavioral coaching to a social skills training program. The coaching was provided via wireless and video conferencing technologies (e.g., bug in the ear) from remote observation sites to students in general education classroom settings and in common-access settings such as the cafeteria, library, or playground. The intervention provided students with a social skills coach while they interacted with students and adults in naturalistic settings so that students could learn how to generalize their social skills knowledge.

Grade Levels:
ES, MS, HS

Focal Populations:
SWD

Technology Developed/Studied:

A Computer-based Social Intervention for Students with High Functioning ASD: Using Technology to Improve Special Education

Award # EDIES11C0033

Janey McMillan, 3-C Institute for Social Development

In this project, researchers iteratively developed and piloted Social Story Theatre, a web-based intervention designed for students with high functioning autism spectrum disorder (HF-ASD). The intervention engaged third- through fifth-grade special education students with animated depictions of social situations and expectations. The product aimed to facilitate improved social functioning in students with HF-ASD by allowing them to practice social skills. The product also provided teachers with student progress reports and included a performance scoring algorithm and data tracker to assess performance.

Grade Levels:
ES

Focal Populations:
SWD

Technology Developed/Studied:

An Interactive Social Tutoring System to Improve and Measure Social Goals for Students Related to Academic and Other School-related Outcomes

Award # EDIES11C0039

Melissa DeRosier, 3-C Institute for Social Development

In this project, researchers developed and studied Zoo U, a web-based learning tool through which fourth- and fifth-grade students engaged animated life-like characters to solve tailored social problems. The prototype of Zoo U was developed under an earlier IES award. Zoo U targeted core social skills through six units: cooperation, communication, emotion regulation, empathy, impulse control, and initiation of play. Researchers also developed an online professional development and implementation tool for teachers.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Interactive Social Tutoring System for Social Skills Training with Elementary Students

Award # R305A110583

Melissa DeRosier, Center for Research in Emotional and Social Health, Inc. (CRESH)

In this project, researchers iteratively developed and studied a computer-based interactive social tutoring system (ISTS) for elementary students experiencing social-behavioral problems at school. The ISTS system facitilated students engagment in tailored, interactive exercises to learn and practice social skills that parallel those taught through an existing evidence-based small group social skills training intervention (S.S.GRIN). The ISTS software tracked students' work and provided school personnel with the ability to document students' progress toward measureable social goals.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Student Self-Management System (SSMS): Reducing Problem Behavior in Upper Elementary Classrooms by Transferring Externally Applied Teacher Controls to Internally Applied Student Controls

Award # R324A110074 Brion Marquez, IRIS Media, Inc.

In this project, researchers iteratively developed and studied the Student Self-Management System (SSMS) for students with or at risk for disabilities who exhibit problem behavior. SSMS was a self-management intervention for students in grades 3 through 6 that aimed to reduce problem behaviors by providing student learning materials that demonstrated the steps of student self-management, providing an online screening and progress monitoring tool that allowed teachers to identify and monitor students needing additional supports, and providing behavior specialists with professional development training resources and out-of-class supports for use with identified students. The intervention included an online platform to support training (video, multimedia, and interactive applications) and assessment.

Grade Levels:
ES, MS

Focal Populations:
SWD

Technology Developed/Studied:

PEAT Communication Scheduler for Autism

Award # EDIES12C0047 Richard Levinson, Attention Control Systems, Inc.

In this project, researchers iteratively developed a prototype of Planning and Execution Assistant and Trainer (PEAT), a software application (app) for mobile devices. PEAT was designed to help non-verbal students with autism spectrum disorder achieve greater independence and self-efficacy. Students carried a mobile phone at all times to access the PEAT app, which provided activity cues and support.

Grade Levels:
ES

Focal Populations:
SWD

Technology Developed/Studied:

Hall of Heroes: An Interactive Social Tutoring System to Improve and Measure Social Goals for Students in Preparation for Transition to Middle School

Award # EDIES13C0041

Melissa DeRosier, 3-C Institute for Social Development

In this project, researchers iteratively developed and studied Hall of Heroes, a web-based social learning game for fifth graders that aimed to prepare them socially and academically for a successful transition to middle school and foster subsequent academic success. The prototype of the product was developed under an earlier IES award. In Hall of Heroes, students interacted with animated life-like characters to solve social problems and build social skills to use in challenging situations. Instructional content focused on six core social skill units: cooperation, communication, emotion regulation, empathy, impulse control, and social initiation.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Efficacy of a Comprehensive School-Based Intervention for Children with High-Functioning Autism Spectrum Disorders (HFASDs)

Award # R324A130216

Christopher Lopata, Canisius College

In this project, researchers evaluated the impact of a comprehensive school-based intervention (CSBI) on the outcomes of children with high-functioning autism spectrum disorders (ASD). The CSBI was developed to increase peer interactions and improve social-communicative understanding, social skills, and academic achievement as well as reduce ASD symptoms. The CSBI consisted of five components: social skills groups for students with social impairments; individual daily notes to prompt, practice, and reinforce newly learned skills; interactive software designed to teach recognition of emotions; therapeutic activities to practice social skills; and parent training.

Grade Levels:
ES

Focal Populations:
SWD

Technology Developed/Studied:

Developing a 3D-based Virtual Learning Environment for Use in Schools to Enhance the Social Competence of Youth with Autism Spectrum Disorder

Award # R324A090197 James Laffey, University of Missouri, Columbia

In this project, researchers iteratively developed and studied iSocial, a social-behavioral intervention delivered in a 3D-based virtual learning environment for middle school students with high functioning autism. iSocial aimed to improve the social behavior of youth with autism by addressing deficits in three areas that comprise social competence: emotion recognition, theory of mind, and executive functioning (a set of cognitive processes that help individuals manage cognitive resources during goal-related activities). The curriculum taught students to recognize facial expressions, share ideas, take turns in conversations, recognize feelings and emotions of self and others, and problem solve.

My Personal Academic Plan

Award # EDIES10P0106 Jennifer Lytle Begonia, ScholarCentric

In this project, researchers iteratively developed and studied a prototype of My Academic Plan, a web-based social-behavioral formative assessment intervention for middle school students. The intervention provided individualized tutorials that students could use during class and included teacher professional development and support.

Transition Success Assessment

Award # R324A100246 James Martin, University of Oklahoma

In this project, researchers designed and validated Transition Assessment Goal Generator (TAGG), a web-based assessment tool for middle and high school students with disabilities, their parents, and teachers to use while developing Individualized Education Programs.

Grade Levels:
MS HS

Focal Populations:
SWD

Technology Developed/Studied:

Assessing Self-Determination in the Era of Evidence-Based Practices: The Development and Validation of Student and Adult Measures of Self-Determination

Award # R324A130065 Michael Wehmeyer, University of Kansas

In this project, researchers designed and validated an assessment for students aged 13 to 22 years with and without disabilities that aimed to measure students' self-determination skills in four domains: autonomy, self-regulation, psychological empowerment, and self-realization. As part of the project, students engaged with a computer adaptive test format to measure their self-determination. The study included students from several different disability categories (learning disabilities, intellectual disability, autism, speech/language disability, and other disabilities), as well as students without disabilities.

Grade Levels:
MS, HS, PA

Focal Populations:
SWD

Technology Developed/Studied:


iSKILLS : The Audio/Video Guidance Repository for Life Skills

Award # R324A100094 Kevin Ayres, University of Georgia

In this project, researchers iteratively developed and studied iSKILLS, a video repository of life skills lessons designed to be delivered to individuals via handheld electronic devices. iSKILLS aimed to support with intellectual disabilities and autism to help them acquire and maintain the life skills necessary for successful post-school transitions. The full program also included direct instruction and self-instruction across several domains including independent living, employment, leisure, community involvement, and community navigation.

Grade Levels:
HS

Focal Populations:
SWD

Technology Developed/Studied:


6. Pathways Into and Through Postsecondary Education

This chapter includes Institute-funded research on technologies aiming to support students as they transition into or progress through postsecondary education, including projects seeking to increase college enrollment and improve transition outcomes for students with or at risk for disabilities. Transitioning into postsecondary education and progressing through the postsecondary pipeline can be difficult. Navigating complex admissions systems, meeting crucial deadlines, and managing competing demands while enrolled in college can lead to stress and undermine students' motivation to persist. Researchers seeking to address these challenges are studying technology to assist students, their families, and their academic advisors.

Table Key

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For more information about these projects and publications stemming from them, please follow the hyperlinked award number to the online abstract on the Institute's website.

Strategizing for College: A Game-based Approach to Increasing College Access

Award # R305A110288

William Tierney, University of Southern California

In this project, researchers iteratively designed and tested an intervention for students from low-income backgrounds to educate them on how to apply and gain acceptance to college though a card game. The full intervention included mentoring and support from teachers as well as an online version of the card game that students could play on Facebook. In the game, students guided a character through class and activity selection, time management challenges, putting together application materials, and acquiring the financial resources to afford college and its related costs.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

Using High School Transcript Data to Improve Student Access to Four-Year Colleges

Award # R305A080263

Karen Levesque, MPR Associates, Inc.

In this project, researchers iteratively developed and studied an intervention for high school students, counselors, and school administrators to improve students' academic preparedness for college. It included data tools and outreach services to support counselors and administrators in using data for college advising and school-level planning. As part of the project, students, counselors, and school administrators engaged with a web-based transcript analysis tool that provided information to improve students' course taking and college planning.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Transition Outcomes for Special Education Secondary Students: Project Choices

Award # R324A090307

Dennis Campbell, University of South Alabama

In this project, researchers iteratively developed and studied Choices, an online intervention for high school students with disabilities. Choices was designed to assist them and their parents in developing valid transitional and educational plans. It included a database of student and family information, community supports and services, and curriculum guides.

Grade Levels:
HS

Focal Populations:
SWD

Technology Developed/Studied:

Factors Associated with the High School Preparation and Post-High School Outcomes of Youth with Disabilities: Secondary Analysis of Data from the National Longitudinal Transition Study-2

Award # R324A100025

Lynn Newman, SRI International

In this project, researchers explored the relationship between school-based interventions and academic, social-behavioral, vocational, and functional outcomes that students with disabilities experienced during and after high school. Researchers aimed to identify school-based instructional programs including technology-based aids and settings, learning supports, supplemental and related services, and accommodations that could improve the high school and post-high school outcomes (e.g., academic achievement, graduation, postsecondary enrollment, employment) of students with disabilities using data from the National Longitudinal Transition Study-2. The study focused on students served under three special education categories: learning disabilities, emotional disturbance, and mental retardation.

Grade Levels:
HS

Focal Populations:
SWD

Technology Developed/Studied:

Promoting College Enrollment among Disadvantaged Students: A Randomized Controlled Trial of Two Low-Cost Interventions

Award # R305A110809

Tiffani Chin, EdBoost Education Corporation

In this project, researchers evaluated the impact of interventions for academically eligible, disadvantaged high school students (e.g., low-income and first-generation) that aimed to increase students' college access: V-SOURCE (Virtual Student Outreach for College Enrollment) and Milestones, a less intensive variant of V-SOURCE. Students who participated in V-SOURCE interacted with a team of college student advisers through virtual technologies (e.g., phone, text, email, MySpace, Facebook, instant message, and Skype). Milestones focused on getting students to complete key college-application milestones using automated reminders and incentives.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Factors Associated with High School and Post-High School Outcomes for Deaf and Hard-of-Hearing Students (Secondary Analysis of NLTS2 Data)

Award # R324A120188 — Lynn Newman, SRI International

In this project, researchers explored the relationships between school-based interventions and outcomes experienced by deaf or hard-of-hearing students during and after high school. Researchers aimed to identify promising programs, policies, technology aids, and interventions that could improve transition outcomes (e.g., academic achievement, graduation, postsecondary enrollment, employment) for these students using the National Longitudinal Transition Study-2 dataset.

Grade Levels:
HS

Focal Populations:
SWD

Technology Developed/Studied:

Dynamic E-Learning to Improve Postsecondary Transition Outcomes for Secondary Students with High Functioning Autism

Award # EDIES13C0026 — Debra Childress, 3-C Institute for Social Development

In this project, researchers iteratively developed and studied a self-paced, adaptive, education software for high school students with high-functioning autism spectrum disorders. The intervention aimed to meet the learning styles and social-emotional needs of students to enable them to pursue educational or employment activities following high school. Through the self-paced online interactive course that also measured progress, students learned about the transition to college and specific resilience strategies for coping with the transition. The software provided individualized instruction that adjusted to the skill level of the user, personalized feedback on performance, and hints for students who struggled.

Grade Levels:
HS

Focal Populations:
SWD

Technology Developed/Studied:

Digital Messaging to Improve College Enrollment and Success

Award # R305A140121 — Chris Avery, Harvard University

In this project, researchers evaluated the impact of high-quality college-going information and informational counseling for high school students from low-income families to increase college access. As part of the intervention, students received text messages with reminders and links to register for college entrance exams, apply for financial aid, and complete pre-matriculation tasks, as well as offers to receive phone-based counseling.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Dual-Credit Courses and the Road to College: Experimental Evidence from Tennessee

Award # R305H140028 — Susan Dynarski, University of Michigan

In this project, researchers evaluated the impact of a dual-credit Advanced Algebra and Trigonometry course for 11th- and 12th-grade students. In these courses, enrolled students would take a centrally graded, standardized, computer-based, end-of-course exam for free. If they passed, they would receive course credit at any public college in Tennessee.

Grade Levels: HS

Focal Populations:

Technology Developed/Studied: ✓

Developing a Program of Postsecondary Academic Instruction over the Corrections Learning Network

Award # R305B070077 — Stephen Steurer, Correctional Education Association (CEA)

In this project, researchers iteratively developed and studied an intervention for adult prisoners. The intervention, called the Corrections Learning Network, was a satellite-based distance learning initiative that provided postsecondary education programming adapted from the Milwaukee Area Technical College's College of the Air program. The curriculum offered students opportunities to earn credits and general education certificates that would lead to earning an Associate of Arts degree.

Grade Levels: PA

Focal Populations:

Technology Developed/Studied:

The Relationship of the Expanded Core Curriculum to Transition Outcomes for Students with Visual Impairments

Award # R324A090288 — Kay Ferrell, University of Northern Colorado

In this project, researchers used data from the National Longitudinal Transition Study-2 to explore the relationship between the Expanded Core Curriculum (ECC) and post-school outcomes for students with visual impairments in general and special education settings. ECC aimed to improve students' academic and post-school outcomes through units that covered compensatory and functional skills, orientation and mobility, social skills, independent living skills, leisure and recreation skills, career and vocational skills, technology-based aids, sensory efficiency, and self-determination.

Grade Levels: PA

Focal Populations: SWD

Technology Developed/Studied:

Evaluating the Success of Undergraduates in the U-Pace Intervention to Improve Academic Achievement for All Postsecondary Education Students

Award # R305A110112

Diane Reddy, University of Wisconsin, Milwaukee

In this project, researchers evaluated the impact of U-PACE, an intervention for undergraduate students to improve their achievement in introductory psychology, sociology, and political science courses and to increase their retention. In U-PACE, students moved at their own pace through online learning modules to cover text chapters taught in a conventional class and had to demonstrate mastery of the material in a module before moving to the next one. Instructors monitored student activity and sent electronic messages identifying the concepts students needed to learn to pass a quiz.

Grade Levels:
PA

Focal Populations:

Technology Developed/Studied:

7. Assistive Technology

This chapter includes Institute-funded research focused on assistive technology (AT) to support students with disabilities. AT is any item, piece of equipment, service, or product system that is used to increase, maintain, or improve the functional capabilities of individuals with disabilities (IDEA, 2004). There are two categories of AT: devices and services. When developing individual education programs (IEPs) for students with disabilities, IEP teams may recommend the use of AT devices. In the past, many professionals thought of AT as exclusively useful for individuals with severe disabilities or sensory impairments. However, that is no longer the case as AT devices are increasingly being developed to support a wide range of students. For example, these devices can include hand-held technologies for speech development in students with autism. There are also many types of AT services, such as training or technical assistance for a student with a disability or for professionals providing education or rehabilitation services to students with a disability.

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Development of an IFSP Form and Process to Maximize Learning Opportunities for Young Children with Disabilities

Award # R324B070033 M. Jeanne Wilcox, Arizona State University

In this project, researchers iteratively developed and studied a system to help service providers develop and increase the use of adaptations for infants and toddlers with disabilities. This system included a form to help create individualized family service plans (IFSPs) and a web-based performance system for providers to use to collect and analyze data. Service providers also received training and ongoing support and mentoring from research staff.

Grade Levels:
EC

Focal Populations:
SWD

Technology Developed/Studied:

Assessing ASL Knowledge and its Relationship to Reading English in Deaf Children

Award # R324A100176 Robert Hoffmeister, Boston University

In this project, researchers designed and validated a video-based assessment to be used by educators of deaf students (from prekindergarten to high school) to determine which students were on a normal language development path and which were above or below the expected ability level. The instrument, called the American Sign Language Assessment Instrument (ASLAI), consisted of a battery of computer-based assessments that measured students' knowledge of synonyms, antonyms, plurals, complex sentences, rare vocabulary, and narrative comprehension in sign language.

Grade Levels:
EC, ES, MS, HS

Focal Populations:
SWD

Technology Developed/Studied:

A Parent-Directed Multimedia Early Intervention Tool to Improve Outcomes in Underserved Children who are Deaf or Hard of Hearing

Award # R324A110122 Dana Suskind, University of Chicago

In this project, researchers iteratively developed and studied Project ASPIRE (Achieving Superior Parental Involvement for Rehabilitative Excellence), a provider-guided, multimedia intervention directed at parents of 12- to 36-month-old children who were deaf or hard of hearing and of low socio-economic status. It aimed to improve the children's educational success by enhancing parents' ability to support their children's listening and language development. Project ASPIRE was designed for early interventionists to use with parents. Parents would work through multimedia modules that incorporated animation and videos, learn how to transmit language and literacy knowledge and skills, and receive feedback about the child's language environment and development via a language processor worn by the child.

Grade Levels:
EC

Focal Populations:
SWD

Technology Developed/Studied:

Enhancing Augmentative and Alternative Communication Rates in pre-K Through 6

Award # EDIES14C0043 Benjamin Grimley, Speak Agent

In this project, researchers iteratively developed and studied an intervention for prekindergarten- through sixth-grade students with special communication needs. The intervention aimed to improve student outcomes by using artificial intelligence software on touch-screen mobile devices. The product adapted prompts and cues to the needs of individual students.

Grade Levels:
EC, ES, MS

Focal Populations:
SWD

Technology Developed/Studied:

National Accessible Reading Assessment Projects: Research and Development for Students with Visual Impairments

Award # R324A060034

Cara Cahalan Laitusis, Educational Testing Service

In this project, researchers designed and validated computer-based assessments of reading proficiency. The goals of the project were two-fold. First, the researchers examined the psychometric properties of state tests administered to students with visual impairments. Second, they tested an accessible assessment of reading and an assessment of technology-assisted reading.

Grade Levels:
ES, MS, HS

Focal Populations:
SWD

Technology Developed/Studied:

The Universal Assessment System (UAS)

Award # ED08CO0056

Michael Russell, Nimble Assessments

In this project, researchers iteratively developed and studied an intervention to provide access to tests for K-12 students with hearing or visual impairments. The Universal Assessment System used signing for students with hearing impairments and electronic Braille displays with embedded writing supports for students with visual impairments. Educational tests were delivered via the Internet or a local CD, and the intervention could enable up to 20 different accessibility and accommodation tools based on a student's need. The use of these tools was monitored during testing.

Grade Levels:
ES, MS, HS

Focal Populations:
SWD

Technology Developed/Studied:

Using the International Classification of Function-Children & Youth to Guide Communication Instruction for Augmentative and Alternative Communication Users

Award # R324A090028

Charity Rowland, Oregon Health and Science University

In this project, researchers designed and validated a diagnostic framework for elementary, middle, and high school special educators and speech-language pathologists who work with students that use assistive technologies to communicate. The framework, called the Augmentative and Alternative Communication—International Classification of Function, aimed to assess the educational and developmental needs of students who rely on non-speech behaviors and devices to communicate. The framework was also designed to help educators and support staff develop more effective Individualized Education Program goals and targets.

Grade Levels:
ES, MS, HS

Focal Populations:
SWD

Technology Developed/Studied:

MyASL Quizmaker

Award # EDIES11C0032

Corrine Vinopol, Institute for Disabilities Research and Training, Inc.

In this project, researchers iteratively developed and studied MyASL Quizmaker, web-based assessment tool for students who are deaf or hard of hearing and use American Sign Language (ASL). The tool was designed to provide automatic ASL graphic and video translations of English for students; enable teachers to create customized tests, exams, and quizzes that were automatically scored; and provide teacher reports with grades and corrected quizzes.

Grade Levels:
ES, HS

Focal Populations:
SWD

Technology Developed/Studied:

Artificial Intelligence Software to Tutor Literary Braille to the Blind and Visually Impaired

Award # EDIES11C0034

Benny Johnson, Quantum Simulations, Inc.

In this project, researchers iteratively developed and studied the Artificial Intelligence Braille Tutor software to provide on-demand Braille literacy support to the visually impaired in kindergarten through 12th grade.

Grade Levels:
ES, MS, HS

Focal Populations:
SWD

Technology Developed/Studied:

iPrompt to Improve Teaching Students with ASD

Award # EDIES11C0040 — Robert Tedesco, HandHold Adaptive, LLC

In this project, researchers iteratively developed and studied iPrompt, a software application (app) for mobile phones and tablet computers to help teachers assist students with autism spectrum disorder (ASD) in their daily activities. The prototype of this app was developed through an earlier IES award. The app used pictures and other visual stimuli to aid students with ASD and their teachers with tasks such as setting expectations, transitioning between activities, increasing attention, and developing social skills.

Grade Levels:
ES, HS

Focal Populations:
SWD

Technology Developed/Studied:

PEAT Communication Scheduler for Autism

Award # EDIES12C0047 — Richard Levinson, Attention Control Systems, Inc.

In this project, researchers iteratively developed a prototype of Planning and Execution Assistant and Trainer (PEAT), a software application (app) for mobile devices. PEAT was designed to help non-verbal students with autism spectrum disorder achieve greater independence and self-efficacy. Students carried a mobile phone at all times to access the PEAT app, which provided activity cues and support.

Grade Levels:
ES

Focal Populations:
SWD

Technology Developed/Studied:

Rocket Reader: A Simplified PDA-based Portable Reading System for Enabling Access to Audio Books and Electronic Documents for Individuals with Intellectual Disabilities

Award # R305S050070 — Daniel Davies, AbleLink Technologies

In this project, researchers iteratively adapted and tested Rocket Reader, a desktop and palmtop software platform for blind or visually impaired middle school students. Rocket Reader was designed to help students access electronic materials in a variety of formats, including audio books, text documents, and documents, more easily.

Grade Levels:
MS

Focal Populations:
SWD

Technology Developed/Studied:

Haptic Immersion Platform to Improve STEM Learning for the Visually Impaired

Award # EDIES11C0028

Marjorie Darrah, Information Research Corporation

In this project, researchers iteratively developed and studied Interactive Touch Science, an integrated software and hardware assistive technology platform. The product included a set of 20 applications that addressed standards-relevant content and aimed to support STEM (science, technology, engineering, and mathematics) learning among middle school students with (or without) visual impairments. The product also provided real-time tactile, visual, and audio feedback.

Grade Levels:
MS

Focal Populations:
SWD

Technology Developed/Studied:

Development of Computer-based Testing Accommodations for Students with Visual Disabilities

Award # R324A110088

Cara Cahalan Laitusis, Educational Testing Service

In this project, researchers refined and validated NimbleTools, an existing computer-based testing platform for students who were blind or had low vision. The final form of NimbleTools was designed to increase accessibility of state assessments for children with disabilities by providing students with adaptations to improve testing accommodations.

Grade Levels:
MS, HS

Focal Populations:
SWD

Technology Developed/Studied:

Expanding Audio Access to Mathematics Expressions by Students with Visual Impairments via MathML

Award # R324A110355 Lois Frankel, Educational Testing Service (ETS)

In this project, researchers iteratively developed and studied a standardized synthetic, speech-rendering tool for math instruction, test preparation, and testing for students in grades 8 through 11 with visual impairments. The tool used ClearSpeak, a mathematical markup language that can be integrated with existing screen reader software used by the visually impaired community. ClearSpeak translated math expressions into descriptions that students with visual impairments could better comprehend. The tool consisted of four components: standardized synthesized speech for rendering mathematical content (ClearSpeak), navigation tools for students, ClearSpeak integration capability with Microsoft Word, and customizable authoring tools for teachers.

Grade Levels:
MS, HS

Focal Populations:
SWD

Technology Developed/Studied:

AnimalWatch-VI Suite: A Comprehensive Program to Increase Access to Mathematics for Students with Visual Impairments

Award # R324A120006 Carole Beal, University of Arizona

In this project, researchers iteratively developed and studied Animal Suite-VI, an intervention for middle and high school students with visual impairments to help them master core algebra-readiness mathematics skills to succeed in high school and beyond. The intervention was a set of 14 web-delivered, accessible instructional modules covering computation, fractions, and variables and expressions. Each module included word problems and instructional scaffolding accessible via self-voicing software, accompanied by braille and tactile graphics. The researchers also developed training materials for teachers.

Grade Levels:
MS, HS

Focal Populations:
SWD

Technology Developed/Studied:

Electronic Performance Support Systems (EPSS) as Assistive Technologies to Improve Outcomes for Secondary Students

Award # R324B070176 Gail Fitzgerald, University of Missouri, Columbia

In this project, researchers iteratively developed and studied the Strategy Tools Support System (STSS) for high school students with disabilities in general education settings. The intervention aimed to help secondary students with learning disabilities or emotional disturbances improve their ability to learn on their own in the context of general education classes. Researchers designed computerized support tools resembling graphic organizers to provide support to student behavior in the following areas: getting organized, learning new information, demonstrating learning, working on projects, solving personal problems, and planning for the future.

Grade Levels:
HS

Focal Populations:
SWD

Technology Developed/Studied:

Factors Associated with the High School Preparation and Post-High School Outcomes of Youth with Disabilities: Secondary Analysis of Data from the National Longitudinal Transition Study-2

Award # R324A100025 Lynn Newman, SRI International

In this project, researchers explored the relationship between school-based interventions and academic, social-behavioral, vocational, and functional outcomes that students with disabilities experienced during and after high school. Researchers aimed to identify school-based instructional programs including technology-based aids and settings, learning supports, supplemental and related services, and accommodations that could improve the high school and post-high school outcomes (e.g., academic achievement, graduation, postsecondary enrollment, employment) of students with disabilities using data from the National Longitudinal Transition Study-2. The study focused on students served under three special education categories: learning disabilities, emotional disturbance, and mental retardation.

Grade Levels:
HS

Focal Populations:
SWD

Technology Developed/Studied:

Factors Associated with High School and Post-High School Outcomes for Deaf and Hard-of-Hearing Students (Secondary Analysis of NLTS2 Data)

Award # R324A120188 Lynn Newman, SRI International

In this project, researchers explored the relationships between school-based interventions and outcomes experienced by deaf or hard-of-hearing students during and after high school. Researchers aimed to identify promising programs, policies, technology aids, and interventions that could improve transition outcomes (e.g., academic achievement, graduation, postsecondary enrollment, employment) for these students using the National Longitudinal Transition Study-2 dataset.

Grade Levels:
HS, PA

Focal Populations:
SWD

Technology Developed/Studied:

The Relationship of the Expanded Core Curriculum to Transition Outcomes for Students with Visual Impairments

Award # R324A090288 Kay Ferrell, University of Northern Colorado

In this project, researchers used data from the National Longitudinal Transition Study-2 to explore the relationship between the Expanded Core Curriculum (ECC) and post-school outcomes for students with visual impairments in general and special education settings. ECC aimed to improve students' academic and post-school outcomes through units that covered compensatory and functional skills, orientation and mobility, social skills, independent living skills, leisure and recreation skills, career and vocational skills, technology-based aids, sensory efficiency, and self-determination.

Grade Levels:
PA

Focal Populations:
SWD

Technology Developed/Studied:

Section II: Technology to Support Teachers and Instructional Practice

This section features 88 projects focused on Technology to Support Teachers and Instructional Practice. The two chapters in this section focus on (1) Instructional Supports and Tools for Classroom Management and (2) Educator Professional Development. These foci were informed by the National Education Technology Plan (U.S. Department of Education, Office of Educational Technology 2010, 2016) and research topics supported by the National Center for Education Research and National Center for Special Education Research.

Each chapter presents relevant projects in table format. The tables provide the project title and award number; the principal investigator and affiliation; a short project description with tags to indicate the grade level(s) on which the project focused;[4] the project's focal population, i.e., English learners or students with or at risk for disabilities; and the types of education technology products developed or studied through the project.

[4] Blank grade levels indicate either that grade ranges are not applicable (i.e., the technology is for researchers or school leaders) or that the information is unavailable.

1. Instructional Supports and Tools for Classroom Management

This chapter focuses on Institute-funded research focused on technologies aimed to support teachers' instructional and classroom practices, including behavior management systems, formative assessment systems, assessments to diagnose student misconceptions of concepts, and tools for increasing student engagement. Broadly, these tools support teachers' ability to manage the learning environment, including both the physical and inter-personal environment and the cognitive environment (e.g., pace and sequencing of learning). Effective classroom management is fundamental to creating a successful learning environment (Jones and Jones 2015; Levin and Nolan 2013), yet continues to be one of the most challenging aspects of the teaching profession (Dreikurs, Grunwald, and Pepper 2013; Evertson and Weinstein 2013). Education technology may provide support to teachers for their instructional and classroom management practices by increasing their efficiency, thereby allowing teachers to allocate more time to teaching (Kim, Copeland, and An 2015).

Table Key

Grade levels:

EC	Early Childhood	HS	High School
ES	Elementary School	PA	Postsecondary and Adult Education
MS	Middle School		

Focal populations:

EL	English Learners
SWD	Students With Disabilities

Products developed or studied:


The spider web icon denotes **web-based** technology developed or studied.


The viewer icon denotes **virtual environment / interactive simulation** developed or studied.


The tutor icon denotes **intelligent tutor / artificial intelligence** technology developed or studied.


The chess piece icon denotes **game-based** technology developed or studied.


The checkmark icon denotes an **assessment** developed, validated, or studied.

For more information about these projects and publications stemming from them, please follow the hyperlinked award number to the online abstract on the Institute's website.

The Virtual STAR Classroom Simulator

Award # ED06PO0908 Christopher Stapleton, Simoysis

In this project, researchers iteratively developed a prototype of Virtual STAR Classroom Simulator, a tool designed to help new teachers in urban classrooms improve their classroom management skills. The tool recorded real-world interactions in urban classrooms and translated these behaviors in to virtual training sessions. The training sessions aimed to prepare teachers for the physical, emotional, and social interactions urban instructors typically face.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Data-Management Program

Award # ED06PO0922 Janet Johnson, Edstar, Inc

In this project, researchers iteratively developed and studied a prototype of an intervention that aimed to increase student success by helping teachers to use quantitative data in teaching and behavior management. Researchers conducted workshops that included prototypes of software and modules used to target students for intervention, standardized data-keeping so records of services could be combined and used for comparisons, monitored progress toward goals, and communicated successful practices.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Development of a Process Methodology to Determine the Cost of Ownership of Instructional Resources in Relation to the Benefits of Improved Student Performance

Award # ED06PO0927 Donald Beers, Progress Education Inc

In this project, researchers iteratively developed and studied a prototype of a software-based intervention for teachers that aimed to increase student success by helping teachers to use quantitative data in instructional decisions. Researchers conducted workshops to show teachers how to target students for intervention, standardize data-keeping so records of services could be combined and used for comparisons, monitor progress toward goals, and communicate using data on successful practices.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Socrative Learning Network

Award # EDIES14C0048 Zach Wagner, Socrative

In this project, researchers iteratively developed and studied a prototype of the Socrative Learning Network, an intervention for teachers to improve instructional practice. The Socrative Learning Network was to be a website that allowed registered teachers to share information and to help teachers in creating, sharing, searching, and filtering assessments by content, grade, or user, with a mechanism for commenting on and editing questions.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Development of an IFSP Form and Process to Maximize Learning Opportunities for Young Children with Disabilities

Award # R324B070033 M. Jeanne Wilcox, Arizona State University

In this project, researchers iteratively developed and studied a system to help service providers develop and increase the use of adaptations for infants and toddlers with disabilities. This system included a form to help create individualized family service plans (IFSPs) and a web-based performance system for providers to use to collect and analyze data. Service providers also received training and ongoing support and mentoring from research staff.

Grade Levels:
EC

Focal Populations:
SWD

Technology Developed/Studied:

The Social Shape Up System

Award # EDIES11C0043 Lynn Singletary, Teaching Research Institute, LLC

In this project, researchers iteratively developed and studied Social Shape Up System, a commercially viable product intended to support PK-8 teachers in managing their classrooms and monitoring classroom behaviors. The prototype for this product was developed under an earlier IES award. Social Shape Up included strategies for teachers to shape student behavior; a web-based database to store, manage, and report student behavior; and a handheld device to facilitate data collection.

Grade Levels:
EC, ES, MS

Focal Populations:

Technology Developed/Studied:

Coh-Metrix: Automated Cohesion and Coherence Scores to Predict Text Readability and Facilitate Comprehension

Award # R305G020018 Danielle McNamara, University of Memphis

In this project, researchers iteratively developed and studied Coh-Metrix and Coh-GIT, tools for writers, editors, and educators to help them estimate the appropriateness of a text for their audience and to pinpoint specific problems with the text (e.g., constructions that might be difficult for readers). Writers could also use the tools to help them write more readable texts that both supported and challenged readers. The tools were developed for use by grade school and postsecondary students.

Grade Levels:
ES, PA

Focal Populations:

Technology Developed/Studied:

Scaling Up an Assessment-Driven Intervention Using the Internet and Hand-held Computers

Award # R305W020001 Barbara Foorman, Florida State University

In this project, researchers iteratively developed and studied an intervention for kindergarten through second-grade teachers to help teachers translate assessment results into instruction through web-based mentoring. As part of the project, teachers performed the assessments on a handheld computer, which guided the teacher in accurate administration procedures, calculated screening and diagnostic results in real time, and uploaded data to web-accessible databases. The databases underlay an online professional development website that related assessment results to intervention activities.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Digitizing the K-8 Portion of the Positive Action Program for Web-Delivery

Award # ED06PO0910 Carol Allred, Positive Action, Inc.

In this project, researchers iteratively developed and studied a functioning prototype of a web-based platform to help teachers implement Positive Action, a K–12 program to promote students' character development, academic achievement, and social-emotional skills and to reduce disruptive and problem behavior.

Grade Levels:
ES, MS, HS

Focal Populations:

Technology Developed/Studied:

The eServe Initiative: An Empirically Supported, Web-based Educational Decision Making Product

Award # ED06PO0918 — Rob Harsh, Software Outfitters, Inc.

In this project, researchers iteratively developed and studied an intervention for kindergarten through 12th-grade teachers and administrators that aimed to reduce exclusionary disciplinary referrals that often result in students with significant behavior problems losing access to classroom instruction, resulting in a higher risk for academic failure. The intervention assisted educators to identify appropriate individualized and group instructional and behavioral interventions for students using a web-based tool that managed student data, recognized patterns, established pre-defined decision-making rules, sent notifications, and provided best-practice behavioral management strategies to teachers.

Grade Levels:
ES, MS, HS

Focal Populations:

Technology Developed/Studied:

Child-Instruction Interactions in Reading: Examining Causal Effects of Individualized Instruction in Second and Third Grade

Award # R305B070074 — Carol M. Connor, Florida State University

In this project, researchers evaluated the impact of Assessment-to-instruction (A2i), a web-based software designed to use algorithms to help second- and third-grade teachers create individualized literacy instruction for their students. The software computed recommended amounts and types of instruction for each child in the classroom and provided organization and planning supports to increase teachers' efforts to individualize literacy instruction.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Using the International Classification of Function-Children & Youth to Guide Communication Instruction for Augmentative and Alternative Communication Users

Award # R324A090028 — Charity Rowland, Oregon Health and Science University

In this project, researchers designed and validated a diagnostic framework for elementary, middle, and high school special educators and speech-language pathologists who work with students that use assistive technologies to communicate. The framework, called the Augmentative and Alternative Communication—International Classification of Function aimed to assess the educational and developmental needs of students who rely on non-speech behaviors and devices to communicate. The framework was also designed to help educators and support staff develop more effective Individualized Education Program goals and targets.

Grade Levels:
ES, MS, HS

Focal Populations:
SWD

Technology Developed/Studied:

Making Room for Student Thinking: Using Automated Feedback, Video-Based Professional Development, and Evidence-Based Practice Recommendations to Improve Mathematical Discussions

Award # R305A100178 Kevin Miller, University of Michigan

In this project, researchers iteratively developed and studied methods to help teachers monitor and improve classroom discussions on mathematics. The researchers conducted small-scale studies testing some of the underlying assumptions of the intervention to be developed, adapted an automated technique for giving teachers daily feedback on the extent of classroom talk, and used video-based online professional development to provide teachers with methods for leading mathematical discussions. The researchers targeted experienced and beginning elementary teachers and fifth- and sixth-grade students to measure changes in the distribution and quality of classroom discussion.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Reliability and Validity Evidence for Progress Measures in Reading

Award # R324A100014 Gerald Tindal, University of Oregon

In this project, researchers validated easyCBM, a free online curriculum-based benchmark and progress monitoring assessment system for elementary teachers, reading specialists, and interventionists that documents early literacy acquisition.

Grade Levels:
ES

Focal Populations:
SWD

Technology Developed/Studied:

iPrompt to Improve Teaching Students with ASD

Award # EDIES11C0040 Robert Tedesco, HandHold Adaptive, LLC

In this project, researchers iteratively developed and studied iPrompt, a software application (app) for mobile phones and tablet computers to help teachers assist students with autism spectrum disorder (ASD) in their daily activities. The prototype of this app was developed through an earlier IES award. The app used pictures and other visual stimuli to aid students with ASD and their teachers with tasks such as setting expectations, transitioning between activities, increasing attention, and developing social skills.

Grade Levels:
ES, HS

Focal Populations:
SWD

Technology Developed/Studied:

myEdna: Web 2.0 Teacher Personal Assistant

Award # EDIES12C0035 Nona Ullman, Improve, LLC

In this project, researchers iteratively developed and studied prototype of myEdna, an intervention for elementary school teachers designed to reduce lesson planning time through web-based personal assistant software that facilitated search, saving, and sharing educational resources used in classroom practice.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Virtual Research Assistant for Teachers

Award # EDIES13C0036 Benjamin Glazer, Eduvant

In this project, researchers iteratively developed and studied a prototype of the Virtual Research Assistant, an intervention for teachers to help them track student progress and intervene through a web-based data dashboard that analyzed student reports and class-level data, mined data, and conducted predictive analyses.

Grade Levels:
ES, MS, HS

Focal Populations:

Technology Developed/Studied:

Project Hi-Fi: Promoting High Fidelity of Screening and Progress Monitoring Assessments

Award # EDIES13C0038 Stephen Fickas, Life Technologies

In this project, researchers iteratively developed and studied a prototype of an intervention for fifth- and sixth-grade teachers to improve their ability to assess special education students' reading fluency through tablet-based software that replaced paper tests. The software provided scoring and tracking assessments with a stop watch to time questions, uploaded evaluation data directly to a database, and included audio playback capability and verified scores or recommended changes.

Grade Levels:
ES, MS

Focal Populations:
SWD

Technology Developed/Studied:

Handheld Technology for Speech Development in Students with Autism Spectrum Disorders

Award # EDIES13C0046 Robert Tedesco, HandHold Adaptive, LLC

In this project, researchers iteratively developed and studied SpeechPrompts, an application for Apple iOS devices for use by special education professionals and other caregivers working with kindergarten through 12th-grade students who exhibit prosodic speech challenges, including students with autism spectrum disorders and specific speech language disorders, hearing impairments, or intellectual disabilities. SpeechPrompts included features, assessment capabities, and therapeutic exercises to help educators guide students' improvements in their prosodic voice quality, thereby strengthening their communication and social skills and capacity for integration in academic, recreational, vocational and community settings.

Grade Levels:
ES, MS, HS

Focal Populations:
SWD

Technology Developed/Studied:

The Classroom Check-up: Supporting Elementary Teachers in Classroom Management Using a Web-based Coaching System

Award # R305A130375 Wendy Reinke, University of Missouri, Columbia

In this project, researchers iteratively developed and studied a web-based version of the Classroom Check-up (CCU), an established consultation intervention for elementary teachers that aimed to support their use of effective classroom management practices. The CCU delivered personalized feedback, encouraged personal responsibility for decisionmaking, and supported self-efficacy by identifying existing strengths and past successes in order to engage teachers in the change process. The web-based CCU integrated user-friendly videos and interactive training experiences for coaches and teachers in an online environment that was feasible for use in schools.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Making Individualized Literacy Instruction Available to All Teachers: Adapting the Assessment to Instruction (A2i) Software for Multiple Real-World Contexts

Award # R305A130517 Carol Connor, Arizona State University

In this project, researchers iteratively developed and studied Assessment to Instruction (A2i), an intervention for first- through third-grade teachers designed to improve students' literacy outcomes through a web-based program that supported teachers' efforts to provide more effective and individualized literacy instruction. The computer program linked student assessment results to recommendations for instructional strategies and activities, provided classroom organization and lesson planning tools, and online professional development, including videos of expert teachers.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Decision Rule Research Project: Curriculum-Based Measurement in Reading

Award # R324A130161 Theodore Christ, University of Minnesota

In this project, researchers designed and validated a set of guidelines for teachers in grade K through 6 of students with or at risk for having a disability. The guidelines provided teachers with decision rules for interpreting curriculum-based measurement scores to make instructional and placement decisions based on the data. As part of the project, teachers engaged with a web-based program that enabled them to enter and interpret student reading data.

Grade Levels:
ES, MS

Focal Populations:
SWD

Technology Developed/Studied:

Zaption Mobile: Develop and Testing a Mobile App for Video Learning

Award # EDIES14C0049 Chris Walsh, Zaption

In this project, researchers iteratively developed and studied a prototype of a mobile platform for Zaption, an intervention for teachers designed to enhance the incorporation of video media in the curriculum. Zaption was designed to allow teachers to add annotations to videos, make short video clips that aligned to topics, and enhance videos with time-linked elements and assessments that appeared at the top of each video.

Grade Levels:
ES,MS, HS

Focal Populations:

Technology Developed/Studied:

The eSparkBeat: A Pulse on the Modern Classroom

Award # EDIES14C0050 Maya Lopuch, eSpark, Inc.

In this project, researchers iteratively developed and studied a prototype of eSparkBeat, a dynamic dashboard to support teachers' use of eSpark, a website that provides teachers curated playlists of tablet-based apps, videos, and assessments tailored to students' individualized learning needs.

Grade Levels:
ES, MS

Focal Populations:

Technology Developed/Studied:

Bridging the Gap: Applying Algebra Cognition Research to Develop and Validate Diagnostic Classroom Algebra Testlet

Award # R305H040099 Michael Russell, Boston College

In this project, researchers designed and validated a set of computer-based algebra short tests—or testlets—for eighth- and ninth-grade algebra students. These testlets were to provide information about students' misconceptions of specific algebraic concepts to enable teachers to use that information to guide their instruction. Researchers instructed teachers on how to use the testlets and examined whether teachers could use them to identify students' misconceptions and to respond appropriately.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

The Diagnostic Geometry Assessment Project

Award # R305A080231 Michael Russell, Boston College

In this project, researchers designed and validated a computer-delivered diagnostic formative assessment of geometric conceptions in the middle grades and developed instructional resources meant to assist teachers in addressing flawed or underdeveloped conceptions identified by the assessment. The assessment targeted sources of difficulties and misconceptions in middle school geometry, specifically properties of shapes, transformations, and measurement.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Scaffolding Students' Use of Multiple Representations for Science Learning

Award # R305A080507 Sadhana Puntambekar, University of Wisconsin, Madison

In this project, researchers iteratively developed and studied an approach to science instruction that used multiple modalities—text, hands-on experimentation, and interactive computer simulations—based on the Concept Mapped Project-based Activity Scaffolding System (CoMPASS). The intervention incorporated learner support both by the teacher and the computer. The researchers hypothesized that a careful integration of multiple modalities within an instructional unit and the design of scaffolding that supported learning between modalities would lead to a deeper conceptual understanding and improved student outcomes. Researchers tested the intervention on a racially and socioeconomically diverse group of middle school students, pre-service teachers, and college students.

Grade Levels:
MS, PA

Focal Populations:

Technology Developed/Studied:

Online Application to Support Inquiry-based Science Teaching

Award # EDIES09C0014 — Robbin Chapman, G8four Consulting

In this project, researchers iteratively developed and studied Online Application to Support Inquiry-based Science (OASIS), an online application developed to facilitate teachers' inquiry-based teaching strategies in their classrooms. The OASIS website was developed to help teachers integrate social networking, media-rich videos, activities, materials, and sensors into teaching middle school science concepts.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

The Learning Element: A Lesson Planning and Curriculum Documentation Tool for Teachers

Award # EDIES10C0018 — Bill Cope, Common Ground Publishing, LLC

In this project, researchers iteratively developed and studied Learning Element 3.0, an online tool for teachers that helps with teacher colloboration, lesson planning, and lesson implementation. Learning Element 3.0 was designed to support multimodal text delivery (text, image, video, audio) and to be used across multiple content areas; it included three online spaces: (1) a teacher resource space in which lesson planning occurs, (2) a learner resource space in which this plan is translated into student-accessible text for independent or semi-independent learning, and (3) a learner workbook space in which students undertake the activities in the learner resource space.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Eliciting Mathematics Misconceptions (EM2): A Cognitive Diagnostic Assessment System

Award # R305A110306 — Pamela Buffington, Education Development Center, Inc.

In this project, researchers designed and validated the Eliciting Mathematics Misconceptions Project, a cognitive diagnostic assessment system to help teachers of middle school students quickly and effectively diagnose commonly held student misconceptions and overgeneralizations in the areas of fractions, decimals, and operations with fractions and decimals. The researchers developed and refined three valid and reliable sets of short, highly focused diagnostic measurement tools.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

An Efficacy Study of Online Mathematics Homework Support: An Evaluation of the ASSISTments Formative Assessment and Tutoring Platform

Award # R305A120125 Jeremy Roschelle, SRI International

In this project, researchers evaluated the impact of ASSISTments, an online formative assessment and mathematics tutoring platform for middle school students, focusing on its relative effectiveness with English learners and students with disabilities. ASSISTments allowed teachers to assign customized online homework to their students and then receive reports on each student's progress. Using ASSISTments, students would complete their homework on laptop computers and receive immediate feedback on their answers, individualized tutoring, hint messages on difficult problems, mastery problem sets that adjusted to knowledge level, and automatic reassessment of a subset of skills to help improve their retention of previously mastered skills.

Grade Levels:
MS

Focal Populations:
SWD, EL

Technology Developed/Studied:

Innovative Computer-Based Formative Assessment via a Development, Delivery, Scoring, and Report-Generative System

Award # R305A120217 Mark Wilson, University of California, Berkeley

In this project, researchers designed and validated a computerized formative assessment system to be used in conjunction with the Assessing Data Modeling and Statistical Reasoning (ADM) middle school curriculum. ADM was designed to teach statistics and modeling but lacked easy-to-use, computerized formative assessments that teachers could leverage to improve their instruction.The researchers aimed to address this by developing such assessments, focusing on six constructs from ADM. The assessments were to be computerized modifications of existing paper-and-pencil tasks, along with new computer-based assessment tasks (e.g., card-sort problems, interactive graph problems).

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Automating the Measurement and Assessment of Classroom Discourse

Award # R305A130030 — Martin Nystrand, University of Wisconsin, Madison

In this project, researchers iteratively designed and validated an automated version of the Classroom Language Assessment System (CLASS), an assessment that codes classroom interactions between a teacher and his or her students and that has been used to identify instructional strategies that promote reading achievement. The program recorded classroom discussions and analyzed their content for discourse characteristics in order to provide feedback and guidance to teachers that could inform their instruction, particularly in reading and literature classes.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Expanding Supports for Data-Driven Language Instruction

Award # EDIES14C0051 — Andy Grant, Lingo Jingo

In this project, researchers iteratively adapted and tested an intervention for middle and high school teachers of English learners designed to improve teachers' instruction through improved functionality of Lingo Jingo, a foreign language teaching and learning website. The new website enhancements included lesson development capabilities, management tools, analytic capabilities, and activities aligned with commonly used language textbooks. The website allowed middle and high school teachers to develop or modify classroom instruction, assign lessons, and provide diagnostic information about student learning.

Grade Levels:
MS, HS

Focal Populations:
EL

Technology Developed/Studied:

Linguistically-Informed Activity Generation Technology to Support English Learner Content Learning

Award # R305A140472 — Jill Burstein, Educational Testing Service

In this project, researchers iteratively developed and studied the Language Muse Activity Palette, an intervention that supports middle school teachers in the creation of text-based content and language learning activities to improve English learners' (ELs) language and comprehension skills through a technology-rich instructional program. Teachers used the web-based program to create content and language learning activities. Teachers uploaded text that the program analyzed and used to generate appropriate instructional activities and recommendations. The program also took teachers through a structured interview and offered guidance about selecting and developing activities appropriate for ELs.

Grade Levels:
MS

Focal Populations:
EL

Technology Developed/Studied:

Online Learning System to Advance Teaching of Hyper Molecular Modeling

Award # ED08CO0044 Keith Donaldson, MolySym, Inc.

In this project, researchers iteratively developed and studied a teaching and training interface for the MolySym Hypermodeling System. The incorporation of electronics and robotics technologies into ball-and-stick models to communicate in real-time with a software simulation system to improve students' understanding of important chemical principles related to three dimensional molecular structures. To help deploy this tool in classrooms, researchers developed a teaching and training interface for MolySym, called the Online Learning System, which included a report and assessment system for collecting data and measuring learning with hypermodels and simulations.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Agent and Library Augmented Shared Knowledge Areas (ALASKA)

Award # R305A080667 Eric Hamilton, Pepperdine University

In this project, researchers iteratively developed and studied ALASKA (Agent and Library Augmented Shared Knowledge Areas), an instructional support platform for teachers of Algebra I. ALASKA integrated four technologies: collaborative workspaces, digital libraries, pedagogical agents (an animated character used in online learning), and tablet computers. While using the program, teachers first assigned classwork that students completed with the assistance of automated tutors that supported learning and supplied information. The students also used ALASKA to communicate with teachers or peers, and teachers used it to view students' work. ALASKA also included a teacher professional development component and curriculum customization.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Algebra Screening and Progress Monitoring

Award # R324A110262 Anne Foegen, Iowa State University

In this project, researchers designed and validated an online progress monitoring assessment system to enable teachers of high school students with disabilities to better monitor students' learning in algebra. The assessment system included six progress monitoring measures with three measures focusing on traditional algebra instruction (e.g., symbolic manipulation) and three reformist measures targeting conceptual understanding and problem solving.

Grade Levels:
HS

Focal Populations:
SWD

Technology Developed/Studied:

2. Educator Professional Development

This chapter includes Institute-funded research focused on technologies to deliver professional development to educators and on solutions to a wide range of challenges facing educators. Professional development that targets educators (e.g., administrators, teachers, related services personnel, and other instructional personnel) and teaching candidates is widely recognized as a crucial component of improving student achievement (Avalos 2011). Institute-funded projects captured in this chapter include those that focused on technologies to help teachers adapt materials for English learner (EL) students, organize instructional environments, and improve their own content learning.

Table Key

Grade levels:

EC	Early Childhood	HS	High School
ES	Elementary School	PA	Postsecondary and Adult Education
MS	Middle School		

Focal populations:

EL	English Learners
SWD	Students With Disabilities

Products developed or studied:


The spider web icon denotes **web-based** technology developed or studied.


The viewer icon denotes **virtual environment / interactive simulation** developed or studied.


The tutor icon denotes **intelligent tutor / artificial intelligence** technology developed or studied.


The chess piece icon denotes **game-based** technology developed or studied.


The checkmark icon denotes an **assessment** developed, validated, or studied.

For more information about these projects and publications stemming from them, please follow the hyperlinked award number to the online abstract on the Institute's website.

Technology Consulting Services

Award # ED06PO0923 Dan Friendrich, Frontier Solutions

In this project, researchers iteratively developed and studied a prototype of the Education Security Practices Survey (ESPS), tool for teachers, administrators, and technology coordinators that aimed to educate them on the balance between classroom technology needs and system security through training modules and a survey tool that addressed practices and perceptions on topics established by the National Telecommunications and Information Administration.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

From Assessment to Action

Award # ED06PO0933 Tara Madhyastha, Facet Innovation

In this project, researchers iteratively developed and studied a prototype of a professional development intervention for teachers that aimed to train them in diagnostic assessment through an online diagnostic assessment system that administrators used to evaluate educational and professional development efforts. This tool addressed the educational data management tools that support No Child Left Behind Act standards.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Modeling and Developing Situation Awareness in Teachers

Award # R305U070007 Kevin Miller, University of Michigan

In this project, researchers iteratively developed and studied an intervention for prospective and novice teachers designed to enhance their ability to monitor students' attention and engagement using the skills that experienced teachers use. As part of the project, teachers watched teacher-perspective classroom video vignettes in small groups and discussed what they observed. Teachers also took individual assessments in which they watched video vignettes on the Tobii eye-tracker while researchers assessed teachers' scanning patterns.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

A Technology-rich Teacher Professional Development Intervention that Supports Content-based Curriculum Development for English Language Learners

Award # R305A100105 Jill Burstein, Educational Testing Service

In this project, researchers iteratively developed and studied a professional development intervention for in-service teachers aimed to improve their ability to provide instruction to English learners (ELs). The professional development included curriculum materials and an online software tool, Text Adaptor 3.0, that assisted teachers in adapting materials for ELs. Text Adapter 3.0 analyzed linguistic characteristics of texts and automated the creation of new support materials that provided support for ELs including translations into Spanish of key words, contextual examples, and simplified prose.

Grade Levels:

Focal Populations:
EL

Technology Developed/Studied:

Professional Development in Early Reading (Classroom Links to Early Literacy)

Award # R305M040167 Douglas Powell, Purdue University

In this project, researchers iteratively developed and studied two variants of a professional development program for prekindergarten teachers in rural areas designed to improve literacy outcomes for children from economically disadvantaged families. One variant of the program was on-site classroom visits from an expert coach with immediate feedback designed to improve teachers' early reading instructional practices. In the second variant, teachers participated in remote coaching using digital video to record themselves while engaged in activities that supported early reading and writing development. Coaches viewed the videos and provided feedback to teachers via the program's website.

Grade Levels:
EC

Focal Populations:

Technology Developed/Studied:

Examining the Efficacy of Two Models of Preschool Professional Development in Language and Literacy

Award # R305M050026 Nancy Clark-Chiarelli, Education Development Center, Inc.

In this project, researchers evaluated the impact of two approaches to implementing the Literacy Environment Enrichment Program (LEEP), a professional development intervention for prekindergarten teachers designed to enhance children's literacy development. The first approach was a traditional face-to-face version of LEEP. The second approach was a technology enhanced, distance-learning form of the professional development called Technology-Enhanced LEEP (T-LEEP). Teachers received the T-LEEP professional development via interactive television, web-based instruction, and face-to-face interaction.

Grade Levels:
EC

Focal Populations:

Technology Developed/Studied:

National Center for Research on Early Childhood Education

Award # R305A060021 Robert C. Pianta, University of Virginia

In this project, researchers evaluated the impact of an in-service professional development program for early childhood teachers that aimed to improve their ability to implement curricula, interact with children, and promote children's social and academic development. The intervention was delivered as a course followed by in-service consultation using the MyTeachingPartner software-based consultation model.

Grade Levels:
EC

Focal Populations:

Technology Developed/Studied:

Classroom Links to Vocabulary and Phonological Sensitivity Skills

Award # R305B070605 Douglas Powell, Purdue University

In this project, researchers iteratively developed and studied professional development for prekindergarten teachers designed to improve children's early literacy outcomes. The professional development leveraged coaching and case-based hypermedia modules that targeted vocabulary development, phonological sensitivity, use of classroom materials, and literacy practices. As part of the coaching, teachers viewed video clips of research-based practices and received accompanying text that highlighted key elements of the practice and related research. Teachers also submitted videotapes of their instruction that coaches critiqued.

Grade Levels:
EC

Focal Populations:

Technology Developed/Studied:

Impact of Professional Development on Preschool Teachers' Use of Embedded-Instruction Practices

Award # R324A070008 Patricia Snyder, University of Florida

In this project, researchers iteratively developed and studied a professional development intervention for teachers of preschoolers with disabilities called Tools for Teachers. As part of the project, researchers compared the effects of two different ways of implementing Tools for Teachers. In both versions, teachers received a toolkit (including a CD and web-based materials) and in-person workshops. However, in one version teachers also received additional on-site expert coaching, and in the other version, teachers participated in web-based self-coaching instead.

Grade Levels:
EC

Focal Populations:
SWD

Technology Developed/Studied:

Development of an Online Course to Improve Teachers' Use of Effective Teacher-Child Interactions during Delivery of Early Literacy and Language Instruction

Award # R305A100154 Bridget Hamre, University of Virginia

In this project, researchers iteratively developed and studied an online professional development course for early childhood teachers to enhance their ability to support children's early literacy and language development. The online course format included lecture, presentation of video examples, online assignments requiring teachers to analyze video examples, reading materials, writing assignments, and classroom-based assignments.

Grade Levels:
EC

Focal Populations:

Technology Developed/Studied:

Using Validated Measures of Children's Engagement **with Teachers, Peers, and Tasks to Guide Teachers' Response Toward Children with Emotional and Behavioral Challenges**

Award # R305A120323 Jason Downer, University of Virginia

In this project, researchers iteratively developed and studied a set of professional development resources designed to help prekindergarten teachers more easily identify and understand children's engagement in the classroom and to more efficiently choose appropriate strategies to increase children's self-regulation skills. The project team developed a teacher consultation model, Learning to Objectively Observe Kids, which intended to improve early childhood teachers' observational skills, increase their understanding of the interdependence between children's behavioral strengths and challenges and the resources available to teachers in the classroom, and help them use the information to meet the needs of young children who display challenging behaviors. An assessment reporting system and online video-based course were developed as part of the model.

Grade Levels:
EC

Focal Populations:

Technology Developed/Studied:

Supporting Young Children's School Readiness and Reduced Challenging Behaviors: An Online Course to Enhance Toddler Teacher-Child Interactions

Award # R324A130249 Jennifer LoCasale-Crouch, University of Virginia

In this project, researchers iteratively developed and studied an online course for teachers of toddlers that aimed to improve the quality of their interactions with children as a mechanism to support their school readiness and reduce challenging behaviors. The course content focused on children's development of relational, regulatory, and language skills and addressed three major areas: children's development of the target skills, universal and classroom-wide practices that support development of the skills, and targeted strategies to promote development of the skills to support children displaying challenging classroom behaviors.

Grade Levels:
EC

Focal Populations:
SWD

Technology Developed/Studied:

Scalable Approaches for Preparing Early Childhood Teachers: Identifying Costs and Effectiveness of Evidence Based Approaches to Coaching

Award # R305A140378 Susan H. Landry, University of Texas, Houston, Health Science Center

In this project, researchers evaluated the impact of a web-based teacher professional development course and in-person or remote coaching support for child care teachers to help them improve children's school readiness. The course presented content through expert commentary and video examples of quality instructional practices and teacher-child interactions. Teachers received coaching either in person or remotely to implement the language and literacy instructional practices and responsiveness strategies that the professional development course presented.

Grade Levels:
EC

Focal Populations:
EL

Technology Developed/Studied:

Internet Implementation of Empirically-Supported Interventions that can be Remotely Delivered in Authentic Preschool Programs for Mothers and Teachers: Evaluation of Direct Child and Teacher Outcomes

Award # R305A140386

Susan H. Landry, University of Texas, Houston, Health Science Center

In this project, researchers evaluated the impact of a web-based professional development program for prekindergarten teachers and training and support for parents that aimed to help them improve children's school readiness.. The professional development program, eTEEM (The Early Education Model), used video examples, web-based coaching, online coursework, and web-based progress monitoring to support teachers' instructional practices. The parent training intervention, ePALs, (Play and Learning Strategies) provided web-based coaching and incorporated video examples of the target behaviors. Parents uploaded videotaped interactions with their children and critiqued the videotapes with their coach.

Grade Levels:
EC

Focal Populations:
EL

Technology Developed/Studied:

Scaling-up Effective Intervention for Preventing Reading Difficulties in Young Children

Award # R305W030257

Patricia Mathes, Southern Methodist University

In this project, researchers evaluated the impact of two interventions for first-grade teachers, Proactive Reading and Responsive Reading, that aimed to enhance children's reading achievement. As part of this project, researchers studied the impact of different professional development coaching approaches including on-site training, online training, and business-as-usual.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

National Research Center on Rural Education Support

Award # R305A040056

Thomas W. Farmer, University of North Carolina, Chapel Hill

In this project, researchers evaluated the impact of multiple interventions across multiple grades (kindergarten through high school) to determine their effects on improving education in rural settings. One of the projects led by the National Research Center on Rural Education (NRCRES) developed a video distance professional development system on writing for K-1 teachers and another studied the impact of in-school facilitators for online advanced placement (AP) courses on student achievement.

Grade Levels:
ES, MS, HS

Focal Populations:

Technology Developed/Studied:

Child Instruction Interactions in Early Reading: Examining Causal Effects of Individualized Instruction

Award # R305H040013

Carol M. Connor, Florida State University

In this project, researchers iteratively developed and studied a professional development intervention for first-grade teachers. The intervention included technology support tools that enabled teachers to provide effective individualized reading instruction. As part of the professional development, teachers learned how to access software and web-based materials that analyzed student assessment data and produced recommendations for individualized instruction.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Can Literacy Professional Development be Improved with Web-based Collaborative learning Tools: A Randomized Field Trial

Award # R305M040086

Anthony Bryk, University of Chicago

In this project, researchers evaluated the impact of Literacy Collaborative, an onsite coaching professional development intervention for kindergarten through third- grade teachers designed to improve teachers' literacy instruction and student outcomes. As part of the professional development, teachers also engaged with the Literacy Coaching toolkit, a supplemental web-based collaborative learning environment.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Teaching Teachers to Teach Critical Reading Strategies (CREST) through an Intensive Professional Development Model

Award # R305M050021

Misty W. Sailors, University of Texas, San Antonio

In this project, researchers iteratively developed and studied a professional development model that taught strategic reading behaviors to elementary and middle school teachers to help improve their students' reading achievement. As part of the project, teachers created online Webquests to support strategy instruction.

Grade Levels:
ES, MS

Focal Populations:

Technology Developed/Studied:

Evolving Inquiry: An Experimental Test of a Science Instruction Model for Teachers in Rural, Culturally Diverse Schools

Award # R305M050109

Elizabeth Doll, University of Nebraska, Lincoln

In this project, researchers iteratively developed and studied a technology-supported professional development program for rural fifth- through eighth-grade science teachers. The program aimed to improve their knowledge and application of biological sciences content and inquiry-based science pedagogy. Teachers participated in a three-phase professional development sequence that was delivered through a combination of education technology, local and project-wide learning communities, and traditional face-to-face instruction.

Grade Levels:
ES, MS

Focal Populations:

Technology Developed/Studied:

Enhancing the Quality of Expository Text Instruction through Content and Case-Situated Professional Development

Award # R305M050121

Deborah C. Simmons, Texas A&M University

In this project, researchers iteratively developed and studied a content- and case-situated professional development model for fourth-grade social studies teachers. The model linked evidence-based practices with the experiences of teachers and provided teachers with an on-demand and video-supported, virtual mentoring and coaching system.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Teaching Reading Comprehension Strategies

Award # R305S050072 Gregory Sales, Seward Incorporated

In this project, researchers iteratively developed and studied a professional development intervention for fourth- through fifth-grade teachers designed to improve their reading comprehension instruction through a DVD video clip series in which teachers modeled instructional techniques that researchers identified as critical for reading comprehension.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Embedded Classroom Multimedia: Improving Implementation Quality and Student Achievement in a Cooperative Writing Program

Award # R305M050086 Nancy A. Madden, Success for All Foundation

In this project, researchers iteratively developed and studied Writing Wings, a professional development intervention for fourth- and fifth-grade teachers to help them transfer effective writing methods learned during a professional development workshop to the classroom. The intervention used multimedia content, classroom instruction, teacher learning communities, manuals and materials, cooperative learning, and metacognitive writing strategies.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Design of an Online Professional Development Resource for Mainstream Teachers of English Language Learners

Award # ED06PO0902 Paul Hopstock, Development Associates

In this project, researchers iteratively developed and studied an online professional development intervention for teachers of English learners (ELs). The intervention provided core concepts and strategies related to EL instruction through self-contained and easily accessed and navigated instruction designed for use on an ongoing, as-needed basis.

Grade Levels:
ES, MS, HS

Focal Populations:
EL

Technology Developed/Studied:

Study of Services to Support Developing an Effective School Plan: An Activity-Based Guide

Award # ED06PO0914 Beverly Farr, Rockman et al.

In this project, researchers iteratively developed and studied a prototype of a software-based intervention for teachers and administrators. Researchers aimed to identify an ideal model for school improvement support to scale-up professional development for data-driven decisionmaking.

Grade Levels:
ES, MS, HS

Focal Populations:

Technology Developed/Studied:

Using Video Clips of Classroom Instruction as Item Prompts to Measure Teacher Knowledge of Teaching Mathematics: Instrument Development and Validation

Award # R305M060057 Nicole Kersting, University of Arizona

In this project, researchers designed and validated a prototype of a video-analysis assessment of teacher knowledge for three pre-algebra topic areas (fractions, ratio and proportion, and equations) that could inform future professional development. Each video-analysis assessment (administered online) consisted of a set of video clips and an analysis task. Teachers analyzed each clip and recorded their responses in text fields.

Grade Levels:
ES, MS

Focal Populations:

Technology Developed/Studied:

Developing a Web-based Classroom Observation System (COS) to Support Increased Teacher Quality

Award # ED07CO0045 Shawn Edmondson, Spectrum Education Group, LLC

In this project, researchers iteratively developed and studied Individualized Remote Information System (IRIS), a small, affordable video camera and web-based software system. IRIS allowed for the remote classroom observation of teachers. This tool aimed to enhance teachers' ability to teach by means of remote observers who provided feedback in real-time during a teacher's lesson as well as follow-up coaching.

Grade Levels:
ES, MS, HS

Focal Populations:

Technology Developed/Studied:

Development of an Interactive, Multimedia Assessment of Teachers' Knowledge of Early Reading

Award # R305A080295 Joanne F. Carlisle, University of Michigan

In this project, researchers designed and validated Enacted Knowledge in Reading Lessons (EKRL), an assessments for first- through third-grade teachers to measure how effectively they used their pedagogical content knowledge in teaching reading and analyzing reading lessons. The team also designed a multimedia, interactive system, Case Studies in Reading Lessons (CSRL) to embed EKRL in. CSRL was intended for use in professional development in reading instruction.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Online Teacher Training: Promoting Student Social Competence to Improve Academic and Behavioral Outcomes in Grades K-3

Award # R324A080150 Brion Marquez, IRIS Media, Inc.

In this project, researchers iteratively developed and studied the Student Social Competence Program, a professional development intervention for elementary school teachers that aimed to provide teachers with instructional approaches for promoting children's social competence and academic outcomes. The intervention was an internet-based, interactive program that consisted of an overview of a response to intervention instructional (RTI) framework for teaching behavior, a how-to guide for implementing a preventive classwide behavior program with the goal of enhancing academic performance, and methods for establishing intensive group interventions for students who do not respond to the classwide behavior program.

Grade Levels:
ES

Focal Populations:
SWD

Technology Developed/Studied:

Establishing Positive Behavior Supports in Elementary School Instructional Settings

Award # R305A090107 Brion Marquez, IRIS Media, Inc.

In this project, researchers iteratively developed and studied an online professional development program for elementary school staff to teach them how to apply Positive Behavior Supports in a wide variety of elementary school settings. The program aimed to enhance teachers' effective classroom management through three modules: understanding and using positive behavior support principles and practices, implementing preventive behavioral approaches, and responding effectively to and correcting minor problem behaviors that interfere with instruction.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

INSPIRE: Urban Teaching Fellows Program

Award # R305A090145 Carla Johnson, University of Cincinnati

In this project, researchers iteratively developed and studied a whole-school, sustained, collaborative, and technology-enhanced science professional development program for elementary and middle school teachers (grades 4 through 6). The intervention aimed to improve teacher attitudes toward teaching science, content knowledge, and strategies to teach science as well as student interest in science and student science content knowledge. The modified program incorporated the following elements: school-level leadership-building activities and the establishment of professional learning communities, a specific focus on elementary school science teachers, the use of technology to bring more resources into the classroom and to streamline the intervention, and teacher participation in two graduate-level science courses in physics and biodiversity.

Grade Levels:
ES, MS

Focal Populations:
EL

Technology Developed/Studied:

Professional Development that is Systemic, Focused on Teacher Growth, Incorporates Coaching, Collaboration, Cohorts, and Increased Knowledge to Create Student Success

Award # R324A090283 Maura Linas, University of Kansas

In this project, researchers iteratively developed and studied STICKS (Systemic, focused on Teacher growth, Incorporates Coaching, collaboration, cohorts, and increased Knowledge to create Student success), a professional development curriculum for kindergarten through eighth-grade teachers that aimed to promote student success by improving teacher practice in general instructional and classroom management practices. The professional development curriculum included web-based units, a coach's manual and training program, collaborative session activities and materials, a web-based evaluation system, and a teacher-identified needs assessment.

Grade Levels:
ES, MS

Focal Populations:
SWD

Technology Developed/Studied:

Developing and Evaluating a Technology-Based Fractions Intervention Program for Low-Achieving and At-risk Students

Award # R305A100110 — Ted Hasselbring, Vanderbilt University

In this project, researchers iteratively developed and studied an intelligent tutoring system, called the Helping At-Risk and Low-Achieving Students in Fractions (HALF), for fifth- and sixth-grade students. The HALF system aimed to promote understanding of fractions by presenting learning problems in conjunction with virtual manipulatives and videos designed to link to-be-learned concepts within already-familiar topics. Researchers also created a professional development webinar to increase teachers' familiarity with and understanding of the software.

Grade Levels:
ES, MS

Focal Populations:

Technology Developed/Studied:

The Targeted Reading Intervention: A Web-Based Professional Development Program Targeting K-1 Classroom Teachers and their Struggling Readers

Award # R305A100654 — Lynne Vernon-Feagans, University of North Carolina, Chapel Hill

In this project, researchers evaluated the impact of the Targeted Reading Intervention (TRI) professional development program, an intervention for kindergarten and first-grade teachers that aimed to increase reading gains for struggling readers . As part of the project, a TRI consultant, via a laptop and webcam, supported diagnostically-driven instruction by the teacher in one-on-one sessions in the classroom.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Prime Online: Teacher Pedagogical Content Knowledge and Research-based Practice in Inclusive Elementary Mathematics Classrooms

Award # R324A100196 — Cynthia Griffin, University of Florida

In this project, researchers iteratively developed and studied Prime Online, an online professional development intervention for in-service regular and special education third- through fifth-grade math teachers. The intervention aimed to improve teachers' content and pedagogical knowledge through modules that addressed four elements: mathematics content, pedagogical content knowledge for teaching elementary mathematics grounded in explicit strategy instruction emphasizing self-regulated learning, the needs of students with learning disabilities included in general education math classrooms, and the use of progress monitoring assessments.

Grade Levels:
ES

Focal Populations:
SWD

Technology Developed/Studied:

Using Data to Foster the School Success of Students with Disabilities

Award # R324A110131 Elizabeth Doll, University of Nebraska, Lincoln

In this project, researchers iteratively developed and studied NU Data, a professional development intervention to help special education teams (grades kindergarten through 12th) use data-based decisionmaking to improve academic outcomes for students with disabilities. As part of NU Data, the teams would receive manuals and ongoing coaching and would work in peer networks. Nu Data also included a manual of intervention procedures and online resource materials including podcasted lectures, video clips, case examples, and coaching cases.

Grade Levels:
ES, MS, HS

Focal Populations:
SWD

Technology Developed/Studied:

Early Truancy Prevention Project

Award # R305A120526 Philip Cook, Duke University

In this project, researchers developed a truancy prevention program for use by elementary school teachers. The program included teacher home-visiting, monitoring of attendance patterns through an electronic attendance information system that teachers could access on their mobile phones, and professional development to help teachers identify and address specific causes of absenteeism. The intervention also aimed to build collaborative relationships between parents and teachers and to promote positive teacher-child relationships.

Grade Levels:
ES

Focal Populations:

Technology Developed/Studied:

Implementing the Common Core State Standards for Students with Disabilities: Research and Development of Web-based Supports for IEP Team Decision

Award # R324A120081 James Shriner, University of Illinois, Urbana-Champaign

In this project, researchers iteratively developed and studied Individualized Education Program (IEP) Quality-Core (IEPQ-Core), a tutorial program for IEP teams to assist them in writing quality IEPs with measurable annual goals linked to the Common Core State Standards. The prototype of this product was developed under an earlier IES award. Teachers of elementary and middle school students accessed IEPQ-Core via a web-based program that provided guidance on writing IEP annual goals in social, emotional, and behavioral areas; related services; and academic content areas.

Grade Levels:
ES, MS

Focal Populations:
SWD

Technology Developed/Studied:

Classroom Connectivity in Promoting Mathematics and Science Achievement

Award # R305K050045 Douglas Owens, Ohio State University

In this project, researchers evaluated the impact of connected classroom technology with interactive pedagogy and professional development on the mathematics and science achievement of students in grades 7 through 10. The connected classroom approach aimed to provide teachers with immediate information that they could use to adjust instruction. This information included displays of student work that were instantly aggregated and available on the teacher's computer as soon as student work was submitted. The intervention consisted of six parts: provision of connected classroom technology (TI-Navigator), professional development, teacher experiential learning in their own classrooms, online web-based training, online discussion forum for the teacher community, and follow-up professional development at an annual conference.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

IEP Quality Improvement: Research and Development of Web-based Decision Support

Award # R324J060002 James Shriner, University of Illinois, Urbana-Champaign

In this project, researchers iteratively developed and studied an intervention for sixth-grade teachers designed to help individual education program (IEP) teams write better quality IEPs to support higher standards-based achievement in reading. The project focussed on teachers of students with reading difficulties (many of whom likely also had specific learning disabilities and/or emotional disturbances). As part of the project, teachers engaged with a web-based IEP tutorial that guided them through a decision-making process that connected all portions of the IEP and provided multiple examples of evidence-based program options.

Grade Levels:
MS

Focal Populations:
SWD

Technology Developed/Studied:

Leadership for Integrated Middle-School Science (LIMSS)

Award # R305A080078 Robert Potter, University of South Florida

In this project, researchers iteratively developed and studied a professional development program, Leadership for Integrated Middle School Science (LIMSS). LIMSS aimed to develop teacher leadership in middle schools and teachers' ability to deliver student-centered, engaging science instruction. Major themes of the professional development included developing teacher leadership skills, enhancing teacher understanding of how students learn, and helping teachers understand how science processes can be incorporated across all content areas of science instruction. The program includes 2-week summer institutes, job-embedded school-year activities and web-supported professional development.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

An On-Line Professional Development Program for FluidMath

Award # EDIES09C0012 Donald Carney, Fluidity Software, Inc.

In this project, researchers iteratively developed and studied an online professional development platform for the FluidMath software. Researchers designed FluidMath to recognize handwritten math formulas and sketches drawn on the screen of a pen-enabled computer. In this project, researchers aimed to create a platform for training teachers to integrate FluidMath into basic algebra practice. The project also examined teacher use of the technology and its promise in increasing student understanding of algebra.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

Accessible Professional Development for Teaching Aquatic Science Inquiry

Award # R305A100091 Kanesa Duncan, University of Hawaii

In this project, researchers iteratively developed and studied a professional deveolpment intervention to help middle and high school science teachers improve their content knowledge, teaching metacogntion (i.e., their ability to reflect on their own teaching) self-efficacy, and ability to lead classroom discussions. The professional development included four modules covering different domains of science, each of which included in-person trainings and video-based online learning support.

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

Developing Guidelines for Optimizing Levels of Students' Overt Engagement **Activities**
Award # R305A110090 Michelene Chi, Arizona State University

In this project, researchers iteratively developed and studied a web-based professional development module for middle school, high school, and community college teachers to help them learn how to modify activities to optimize student engagement. The intervention explained and demonstrated various active learning behaviors and described to teachers the characteristics of activities associated with different levels of student engagement. The module gave teachers examples of recommended practical procedures that could be adopted to enrich their classroom and homework activities.

Grade Levels:
MS, HS, PA

Focal Populations:

Technology Developed/Studied:

Strengthening School Leaders' Instructional Leadership Practice through Developing Teachers' Abilities to Integrate Technology in Support of Student Learning
Award # R305A110913 Sara Dexter, University of Virginia

In this project, researchers iteratively developed and studied CANLEAD (Cognitive Assistance Network, Learning Environment, and Database), a year-long leadership professional development institute and web-based learning environment for middle school leadership teams (groups that incude principals, teacher-leaders, and technology speciailists). CANLEAD aimed to train leadership teams to recognize what strong instruction in math and science looked like when it integrated technology and to carry out the instructional leadership practices needed to foster integration of technology into math and science instruction. CANLEAD's online learning environment included curricula, math and science technology resources, planning tools, video-conferencing, and social networking tools.

Grade Levels:
MS

Focal Populations:

Technology Developed/Studied:

Effect of the SUN Teacher Workshop on Student Achievement

Award # R305B070443 Ann Batiza, Milwaukee School of Engineering

In this project, researchers iteratively developed and studied Students Understanding eNergy, an in-service training workshop for high school teachers that aimed to help teachers build a deeper understanding of potentially difficult concepts, like energy transfer in biological systems and the impact of these processes on the flow of matter and energy in biology. In the workshop, high school teachers learned to use interactive physical models that provided multisensory experiences. In addition to the physical models, teachers were provided with interactive and hyperlinked computer visualizations, animations, pen and paper exercises, schematics, and other materials to help them teach high school biology.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Growth Mindset Learning Platform for Educators and Students: Supporting Academic Motivation and Achievement through an Integrated Online Platform

Award # EDIES10C0022 Lisa Sorich Blackwell, Mindset Works, LLC

In this project, researchers iteratively developed and studied the Growth Mindset Learning Platform (GMLP), which was developed to support an existing program, called Brainology. Brainology was a social-behavioral software program designed to strengthen students' ability to succeed in school and life by teaching students how the brain learns and changes with effort and how to use effective study skills to increase learning. GMLP professional development applications addressed how to apply instructional supports to develop and sustain a growth mindset (i.e., the belief that one can improve his or her intelligence through effort and practice).

Grade Levels:
MS, HS

Focal Populations:

Technology Developed/Studied:

Increasing Adolescent Engagement**, Motivation, and Achievement: Efficacy of a Web-Based, Teacher Professional Development Model**

Award # R305A100367 Joseph Allen, University of Virginia

In this project, researchers evaluated the impact of My Teaching Partner-Secondary (MTP-S) on teacher-student interactions as they relate to improving student behavioral and achievement outcomes. MTP-S was a web-based system of professional development for high school teachers designed to help them understand the developmental needs of adolescent students. MTP-S aimed to change the quality of teacher-student interactions in ways that enhanced student engagement and motivation, reduced problematic behaviors, and increased student achievement.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

Enhancing Knowledge Related to Research-Based Early Literacy Instruction among Pre-Service Teachers

Award # R305W060024

Donna Scanlon, State University of New York (SUNY), Albany

In this project, researchers designed and tested a set of multimedia training materials that could be used in pre-service teaching methods courses. The materials were to focus on teaching methods for language arts courses, and they aimed to increase pre-service teachers' exposure to and understanding of scientifically-based reading instruction.

Grade Levels:
PA

Focal Populations:

Technology Developed/Studied:

PlatinuMath: An Online Formative Assessment Math Game for Preservice Elementary Teachers

Award # EDIES11C0045

Scott Brewster, Triad Digital Media

In this project, researchers iteratively developed and studied PlatinuMath, a web-based mathematics game for pre-service teachers. The intervention aimed to strengthen and measure pre-service teachers' knowledge of mathematics and provide college instructors with accurate assessments of their students' mathematical understanding. PlatinuMath included a series of narrative-based mini-games that covered 24 standards-relevant topics and supplemented any pre-service curriculum or training course.

Grade Levels:
PA

Focal Populations:

Technology Developed/Studied:

Section III: Technology to Support Research and School Improvement

This section features 32 projects focused on Technology to Support Research and School Improvement. It is organized into two chapters: one on Tools for Researchers and one on Technology for School Improvement. Chapter topics were informed by work supported by the National Center for Education Research and National Center for Special Education Research.

Each chapter presents relevant projects in table format. The tables provide the project title and award number; the principal investigator and affiliation; a short project description with tags to indicate the grade level(s) on which the project focused;[5] the project's focal population, i.e., English learners or students with or at risk for disabilities; and the types of education technology products developed or studied through the project.

[5] Blank grade levels indicate that grade ranges are not applicable (i.e., the technology is for researchers or school leaders) or that the information is unavailable.

1. Tools for Researchers

This chapter includes Institute-funded projects offering specialized tools, methods, and technology solutions designed to help researchers. For example, technologies may be designed to help researchers better estimate the size of achievement gaps, more effectively use student data from multiple sources, and better analyze extant data to gain deeper insights into educational systems and practices.

Table Key

Grade levels:

EC	Early Childhood	HS	High School
ES	Elementary School	PA	Postsecondary and Adult Education
MS	Middle School		

Focal populations:

EL	English Learners
SWD	Students With Disabilities

Products developed or studied:


The spider web icon denotes **web-based** technology developed or studied.


The viewer icon denotes **virtual environment / interactive simulation** developed or studied.


The tutor icon denotes **intelligent tutor / artificial intelligence** technology developed or studied.


The chess piece icon denotes **game-based** technology developed or studied.


The checkmark icon denotes an **assessment** developed, validated, or studied.

For more information about these projects and publications stemming from them, please follow the hyperlinked award number to the online abstract on the Institute's website.

Practical Solutions for Missing Data and Imputation

Award # R305D090006 Andrew Gelman, Columbia University

In this project, researchers developed methods for multiple imputation of missing data to inform better missing data models and algorithms and to increase computational efficiency in education research studies. As part of the project, researchers developed software to help users identify potential problems at the outset, choose the right model and accommodate complications, and implement other missing data strategies to allow for comparisons.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Development of Accessible Methodologies and Software in Hierarchical Models with Missing Data

Award # R305D090022 Stephen Raudenbush, National Opinion Research Center (NORC)

In this project, researchers developed methods for handling missing data in analyses of multilevel data and hierarchical models. In particular, the researchers developed new analysis methods and software to estimate models and impute missing data and conducted trainings to help others use the methods and software.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Cross-Classified Structural Equations Model: Development of an OpenMX Module and its Application to Multiyear Assessment and Intervention Data in Literacy Research

Award # R305D090024 Paras Mehta, University of Houston

In this project, researchers developed a software library for fitting cross-classified structural equations models (CC-SEM). This software was to help education researchers accurately model longitudinal, nested student data that was partially cross-classified due to dispersion of students from the same classroom to different classrooms. As part of the project, researchers documented the software library as well as the CC-SEM modeling framework and developed a user-friendly manual for the CC-SEM software.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Generalized Dimensionality Assessment for Multidimensional Psychometric Models

Award # R305D100021 Roy Levy, Arizona State University

In this project, researchers developed new statistical methods designed to help education researchers conduct dimensionality analysis for multidimensional item response theory (IRT) models. These procedures would allow education researchers to detect when two or more variables may be related to the same observable variable. As part of the project, the researchers developed and distributed software to conduct such analyses using the free statistical software package, R.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Software to Compute Effect Sizes for Cluster-Randomized Trials

Award # EDIES11C0037 Michael Borenstein, Biostatistical Programming Associates, Inc.

In this project, researchers developed software that computed the standard mean difference (symbolizd by *d*) and its standard error for cluster-randomized trials (including 2-level and 3-level designs). The program enabled researchers to identify the design they were using and enter the data correctly, and provided annotation to help with choosing the appropriate reference group. The program also carried out complex calculations without the user having to know the formulas.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Bayesian Inference for Experimental and Observational Studies in Education

Award # R305D110001 David Kaplan, University of Wisconsin, Madison

In this project, researchers developed best practice guidance in Bayesian statistical modeling and open-source software to carry out this work. The guidance and software was to help education researchers conduct analyses of three common experimental designs: randomized experimental, quasi-experimental/observational, and longitudinal.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Increased Accuracy in the Detection of Differential Item Functioning through Multilevel Analysis

Award # R305D110014 Brian French, Washington State University

In this project, researchers developed methods for detecting differential item functioning (DIF) when analyzig multilevel data. In addition to developing these methods, the researchers developed code for two common statistical analysis programs, R and SAS, so that education research could conduct the DIF analyses.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Addressing Practical Problems in Achievement Gap Estimation: Nonparametric Methods for Censored Data

Award # R305D110018 Sean Reardon, Stanford University

In this project, researchers developed methods to measure achievement gaps (i.e., differences in group achievement and inequities in educational advantages and opportunities). As part of the project, researchers developed a set of practical guidelines for measuring achievement gaps based on categorical proficiency data along with free software to enable researchers and stakeholders to estimate these gaps.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Psychometric Models for 21st Century Educational Survey Assessments

Award # R305D110027 Matthias Von Davier, Educational Testing Service

In this project, researchers developed methods to conduct statistical analysis of data from large-scale survey assessments including the National Assessment of Educational Progress (NAEP), Trends in Mathematics and Science Study (TIMSS), Progress in International Reading Literacy Study (PIRLS), and the Programme for International Student Achievement (PISA). The researchers also developed software for education researchers to use while estimating different models.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Weighting Methods for Mediation Analysis in Experimental and Quasi-Experimental Multilevel Data

Award # R305D120020

Guanglei Hong, National Opinion Research Center (NORC)

In this project, researchers developed propensity-scored-based weighting methods for revealing the mediation mechanisms in multi-level education settings. The researchers used a combination of theory, simulation studies, and secondary data analyses to develop and to test the weighting methods and to compare their methods with others (e.g., path analysis and the instrument variable method). The researchers also developed software to help education researchers to implement the weighting procedures.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Accessible Methodology and User-Friendly Software for Multivariate Hierarchical Models Given Incomplete Data

Award # R305D130033

Yongyun Shin, Virginia Commonwealth University

In this project, researchers developed methods and software to analyze multivariate hierarchical models with missing binary and ordinal data. The software required users to know and to input only the model they intended to analyze; the software automated the remainder of the analysis steps.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

2. Technology for School Improvement

This chapter includes Institute-funded research focused on technologies designed to improve data-based decisionmaking, aid student matriculation planning, and enhance school resource management. Technology may enhance school improvement efforts, particulary in the area of data-use (U.S. Department of Education, Office of Educational Technology 2010, 2016). For example, school improvement efforts specifically target the operation and management of schools to improve student achievement (Herman et al. 2008). Huberman and Miles (2013) contend that school improvement is not an exact science but rather a process of matching assessed needs with appropriate solutions that take into account the political, social, and educational environments of the communities in which they are found. Effective, lasting school improvement requires a myriad of considerations, strategies, partners, and approaches to a wide range of underlying problems (Perlman and Redding 2011).

Table Key

Grade levels:

EC	Early Childhood	HS	High School
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For more information about these projects and publications stemming from them, please follow the hyperlinked award number to the online abstract on the Institute's website.

Cost Accounting for Student-Level Resources

Award # R305E050089 William Hartman, Pennsylvania State University

In this project, researchers iteratively designed and validated a cost-accounting system to help school and district administrators make resource allocation decisions that are tied to student-level learning outcomes. The system provided detailed cost information related to how resource decisions were made for students, and collected, organized, and reported multiple levels of expenditure data. With these data, administrators who tested the system were able to make changes to resource allocations in ways that had the potential to improve student outcomes.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

School Forward Tracker: An Online Tool to Help Schools Implement and Monitor Action Plans for School Improvement

Award # R305S050040 Scott Burg, Rockman et al.

In this project, researchers iteratively developed and studied the School Forward Tracker, a web-based platform to help school and district administrators formulate, implement, and evaluate the school improvement process. School Forward Tracker's platform was designed to help administrators store, maintain, and use school improvement plan data, and it included a dashboard with tools for budget planning and allocation, monitoring of implementation, evaluation of results, and reporting.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Education Scorecard

Award # ED06PO0916 Keith Morical, ROI.com, Inc.

In this project, researchers iteratively developed and studied a prototype of an intervention that aimed to enhance schools' ability to support educational excellence through an integrated electronic "Educational Scorecard" that assisted schools with education data management.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Student Outcomes Analysis Reporting (SOAR) Server

Award # ED06PO0917 Jason Davidson, Tracen Technologies, Inc.

In this project, researchers iteratively developed a prototype of Student Outcomes Analysis Reporting (SOAR), a web-based data storage and reporting server. SOAR aimed to integrate existing student data into a program that would both store information and provide template reports to schools for student progress monitoring. SOAR was to provide more accurate trends and patterns regarding students' academic and behavioral outcomes.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Technology Consulting Services

Award # ED06PO0923 Dan Friendrich, Frontier Solutions

In this project, researchers iteratively developed and studied a prototype of the Education Security Practices Survey (ESPS), tool for teachers, administrators, and technology coordinators that aimed to educate them on the balance between classroom technology needs and system security through training modules and a survey tool that addressed practices and perceptions on topics established by the National Telecommunications and Information Administration

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Data Services Model to Support Effective Management, Analysis, and Use of Data

Award # ED06PO0925 Martha Williams, Center for Resource Management

In this project, researchers iteratively developed and studied a prototype of a software-based intervention for school administrators that aimed to improve compliance with No Child Left Behind equity, continuous improvement, and accountability standards through a data services software system that supported data management, integration, disaggregation, and analysis functions that did not require technical personnel support.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Education Data Management System

Award # ED06PO0928 Madhu Nair, Ansya Enterprise Solutions

In this project, researchers developed technology to improve schools' ability to make data driven decisions. The goal was to help schools collect the most relevant data and match individual student records in order to improve the overall efficacy and effectiveness of the school and educational system.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Prototype Software Application

Award # ED06PO0929 Robert Cheetham, Avencia Inc

In this project, researchers iteratively developed and studied a prototype of a software tool that managed educational data to improve administrators' ability for data tracking and analysis.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Consulting Framework

Award # ED06PO0934 Patrick Haggood, Mateo Software Consulting

In this project, researchers iteratively developed and studied a prototype of software to help schools and districts reduce professional development costs, accelerate technology implementation, and capture student achievement data. The software was an an open-source aggregator that linked existing learning management data into forms already familiar to practitioners (e.g., teachers and administrators).

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Research on Education Data Management to Assist in the Acquisition or Re-Purposing of Testing, Environment, and Resources Databases to Assist Educators in Meeting the Requirements of NCLB

Award # ED06PO0935 — Robert Tennyson, CYBER Learning Corporation

In this project, researchers iteratively developed and studied a prototype of a software-based intervention for practitioners (e.g., principals and other administrators) that aimed to provide readable and interpretable evaluation results and identify their causal factors. The intervention included a database that described lessons learned from existing case studies focused on testing, environment, and resources. The database also allowed cross-comparison of student improvement through each factor.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Development of Fiscal Management Tools for Charter Schools

Award # ED06PO0959 — Cathi Vogel, Vogel & Associates

In this project, researchers iteratively developed and studied a prototype of an intervention that aimed to prevent charter school closures. The intervention was a series of software tools that used a business management approach and that were tailored to address working capital and cash flow management, budgeting and long-range financial planning, and additional administrative services outsourcing products.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

MeasureResults: A Web-based Tool to Support School Administrators in Conducting Analyses

Award # ED08CO0055 — Robert Smith, Empirical Education, Inc.

In this project, researchers iteratively refined and tested a new component for MeasureResults, an intervention for school principals and other administrators that aimed to enhance administrators' ability to make decisions based on data. MeasureResults was initially designed as a web-based platform for school staff (e.g., principals). It built customized reports and came with support from statisticians working with MeasureResults. Refinements aimed to help principals and other administrators use MeasureResults to conduct their own quasi-experiments through both a new interface and trainings.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

Strategic School Funding for Results Project, Phase II

Award # R305A100630 Jay Chambers, American Institutes for Research

In this project, researchers iteratively developed and studied Strategic School Funding for Results (SSFR), an intervention for school district leadership to help them make resource management decisions. Researchers aimed to make SSFR a needs-based funding model with policies and tools for addressing decisionmaking and accountability regarding how funds were used. It included a resource allocation formula, computerized district and school level data management systems, and fidelity of implementation measures.

Grade Levels:

Focal Populations:

Technology Developed/Studied:

TEIDS Plus: Integrating Quality Assurance and Data-based Decision Making to Enhance IFSP Quality, Implementation, and Child and Family Outcomes

Award # R324B070003 Robin McWilliam, Siskin Children's Institute

In this project, researchers iteratively developed and studied Tennessee Early Intervention Data System Plus, a web-based quality assurance system for early intervention service coordinators. The system aimed to improve the outcomes of infants and toddlers with disabilities and their families by helping interventionists develop and implement quality individualized family service plans (IFSPs). Using the system, service coordinators would engage with a web-based series of prompts or guiding questions about the IFSP process as they proceeded through various stages of IFSP development with each child and family. In addition to these guiding questions, service coordinators accessed links to additional resources like presentations, video clips, procedural guidelines.

Grade Levels:
EC

Focal Populations:
SWD

Technology Developed/Studied:

The eServe Initiative: An Empirically Supported, Web-based Educational Decision Making Product

Award # ED06PO0918 Rob Harsh, Software Outfitters, Inc.

In this project, researchers iteratively developed and studied a prototype of eServe, an intervention for kindergarten through 12th-grade teachers and administrators that aimed to reduce exclusionary disciplinary referrals. The intervention assisted teachers and principals to identify appropriate individualized and group instructional and behavioral interventions for students. eServe was designed to be a web-based tool that managed student data, recognized patterns, established pre-defined decisionmaking rules, sent notifications, and provided best-practice behavioral management strategies.

Grade Levels:
ES, MS, HS

Focal Populations:

Technology Developed/Studied:

Study of Services to Support Developing an Effective School Plan: An Activity-Based Guide
Award # ED06PO0914 Beverly Farr, Rockman et al.

In this project, researchers iteratively developed and studied a prototype of a software-based intervention for teachers and administrators. Researchers aimed to identify an ideal model for school improvement support to scale-up professional development for data-driven decisionmaking.

Grade Levels:
ES, MS, HS

Focal Populations:

Technology Developed/Studied:

Study of Educational Improvement Planning System Feasibility for Promoting Effective School Improvement and Planning
Award # ED06PO0915 Terri Akey, Rockman et al.

In this project, researchers iteratively developed and studied a prototype of an intervention for researchers and administrators that aimed to support school improvement planning through an online tool paired with on-site technical assistance that developed measurable, actionable improvement plans, and collected data.

Grade Levels:
ES, MS, HS

Focal Populations:

Technology Developed/Studied:

Strategies for Providing Evidence-Based Learning Opportunities
Award # ED06PO0924 Charles Cowen, Analytic Force

In this project, researchers developed and studied a prototype of a software dashboard to help educators leverage their data and experience to develop actionable plans for students kindergarten to 12th-grade. The software was to synthesize student assessment data, as well as student, teacher, principal and school characteristics in order to determine student's performance levels and strengths and weaknesses and to recommend learning or teaching strategies while also predicting student performance under different personalized learning regimens.

Grade Levels:
ES, MS, HS

Focal Populations:

Technology Developed/Studied:

A Proposal to Measure the Impact of Indiana's System of Diagnostic Assessments on Student Achievement Outcomes

Award # R305E090005 Shazia Miller, Learning Point Associates

In this project, researchers evaluated the impact of Indiana's statewide, computer-based, diagnostic assessment intervention on changes in math teachers' instructional behaviors and on K-8 student performance on state accountability math tests. The assessment intervention used different assessments based on the students' grades. For K-2 students, it used mCLASS®:Reading and mCLASS®:Math. For grades 3–8 students, it used a system called Acuity from CTB/McGraw-Hill. All the assessments were online, and teachers, adminstrators, and staff from the Indiana Department of Education could review data. The researchers aimed to provide evidence regarding the value of using interim assessments to monitor student progress in order to guide instruction and increase student achievement.

Grade Levels:
ES, MS

Focal Populations:

Technology Developed/Studied:

Differentiated Placement Quality Control Model

Award # ED06PO0913 Marilyn Ryll, Ryll International

In this project, researchers developed a prototype of a tool that would help improve differentiated placement proceedures for English language learners (ELLs). As part of the project, they explored the relationship between the ELL placement practices of representative high schools and resulting classroom compositons, instructional practices and curricula, and students outcomes.

Grade Levels:
HS

Focal Populations:
EL

Technology Developed/Studied:

Using High School Transcript Data to Improve Student Access to Four-Year Colleges

Award # R305A080263 Karen Levesque, MPR Associates, Inc.

In this project, researchers iteratively refined and tested Transcript Evaluation Service (TES), an intervention that provides data tools to students, counselors, and school administrators and outreach services to counselors and administrators to help with college advising and school-level planning. The research team aimed to develop new components for TES by optimizing the transcript analysis procedures, refining student reports by translating them into Spanish and adding more financial aid-related information, and developing a web-based transcript analysis tool for the school databases.

Grade Levels:
HS

Focal Populations:

Technology Developed/Studied:

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Appendix A: Compendium Process

The Institute identified 401 projects, spanning 13 years (2002-2014), to be included in this compendium. These projects included NCER and NCSER research grants, evaluation contracts, and other awards. The compendium process was highly collaborative, with multiple rounds of feedback from the Institute and Dr. Art Graesser, the content advisor with expertise in education technology. The contractor led the writing of the project descriptions and the development of the structure of the compendium. Dr. Graesser and the Institute provided feedback on the proposed structure, and the Institute provided additional feedback on writing conventions. The Institute also provided all project information, including the full abstracts, a list of publications and products, and other award information.

Project Descriptions

The contractor developed a project description template that included prescriptive guidelines on verb tense, verb usage, description length, and sentence stems. For each project, the contractor wrote a short project description using the project abstract provided by the Institute.[6] To ensure consistency across the project descriptions, the contractors used the past tense and active voice for all projects.

Project descriptions are typically 100 words or fewer and highlight key areas of the project abstract including the following:

- the theory or motivation behind the project;
- the type of research project;
- the population of students/project focus; and
- the level of intervention (e.g., student, class, school).

NCER and NCSER fund research that align with the following research goals: exploration, development and innovation of interventions (e.g., curricula, policies), evaluation, and development and validation of assessments.[7] To help readers categorize projects appropriately, the contractor developed a set of common verbs and sentence stems associated with each research goal, as shown below:

[6] Copies of the full abstracts, which served as the source documents for this compendium, are available online at http://ies.ed.gov/funding/grantsearch.

[7] These research types reflect the Research Goals described in NCER's Request for Applications for Education Research and NCSER's Request for Applications for Special Education Research. These two requests, however, identify five research goals: Exploration, Development and Innovation, Efficacy and Replication, Effectiveness, and Measurement. For the purposes of this compendium, we combine Efficacy and Replication and Effectiveness under the term *evaluation.*

Research Goal	Sentence Stems	Recurring Verbs
Exploration	"In this project, researchers explored the relationship between" "In this project, researchers explored how"	Explored
Development and Innovation of Policies and Practices	"In this project, researchers iteratively developed and studied" "In this project, researchers iteratively adapted and tested"	Developed Adapted Tested
Evaluation	"In this project, researchers evaluated the impact of"	Evaluated
Development and Validation of Assessments	"In this project, researchers designed and validated" "In this project, researchers validated"	Designed Validated

Compendium Categorization

The categorization process included tagging each project for domains—such as settings, grade level, focal population, and type of technology developed or studied—and categorizing each project into compendium sections and chapters. The three sections of the compendium include: Technology to Support Student Learning (in which the target of the project was students themselves or their families), Technology to Support Teachers and Instructional Practice, and Technology to Support Research and School Improvement. Each section includes multiple chapters, based on a major research focus. The contractor developed a categorization scheme in partnership with the Institute and the external content advisors. The categorization scheme, shown in the text boxes that follow, includes section headers (e.g., Technology to Support Student Learning), chapter headers (e.g., Cognition), section and chapter descriptions, and key words.

After developing the definitions for and parameters of each section and chapter, the contractor reviewed each project description to determine the section and chapter in which each project would best fit. Per Institute guidance, the contractor categorized projects for this compendium into multiple sections and chapters. The contractor followed these guidelines set forth by the Institute:

1. Within a section, a project was listed only once according to its primary focus. An exception to this rule was made for the Assitive Technology chapter in order to help readers quickly locate information about this specific area of research. Projects could be categorized in the Assistive Technology chapter and another chapter in the student section or across sections.
2. A project could be listed across sections if a project had equal or near equal focus on more than one of the other research foci.

Per Institute guidance, the contractor did not consult additional information sources or review publications from projects for more information about the projects. Thus, the Institute was the sole source of project information. Institute staff verified all project information presented in this compendium. Two contract staff independently categorized each of the projects and compared their categorizations. In instances where the two coders did not agree, a third contract staff member was brought in for reconciliation. For any project in which the contract staff could not reach agreement,

Institute staff provided further assistance or documentation to determine the best chapter for each project. Upon completion of all categorizations, Institute staff reviewed the categorization(s) of each project to ensure content accuracy and agreement.

In addition to determining the section and chapter in which a project should be placed, the contractor coded projects for the student population (i.e., grade level, English learners, and students with or at risk for disabilities). The grade level reflects the grade range of students who are targeted by the technology or who are taught by those targeted by the intervention (e.g., elementary school teachers) as noted in the abstracts, and, when this information was not available, Institute staff provided additional documentation. Projects received the abbreviation EL to note the inclusion of English learners (ELs) as a primary focus population or a significant component of the sample group. All projects funded through NCSER necessarily had students with or at risk for disabilities as part of their samples and, thus, received the abbreviation SWD. NCER projects in which students with or at risk for disabilities were a noted as a subgroup in the research plan also received a SWD abbreviation. The coding process followed was similar to that of the categorization process. Two contract staff coded each project for reconciliation. A third contract staff member was brought in if necessary, and, for any instance in which contract staff could not reach agreement based on the abstracts provided by the Institute, Institute staff provided further assistance or documentation. Finally, Institute staff verified all codes or tags for grade-level and focal population.

The categorization scheme for the Technology to Support Student Learning section and chapters are provided below.

Categorization Scheme for Technology to Support Student Learning		
Chapter Headers	**Definition**	**Key Words**
1. Cognition	This chapter focuses on projects intended to impact or affect processes through which an individual obtains knowledge or conceptual understanding (cognitive processes) or conditions that affect cognitive processing. Projects focus on student mental processes, and not social interactions or behaviors.	Abstract reasoning, anxiety (math, test, writing, etc.), attention, concept formation, critical thinking, executive function, self-regulation, logical thinking, memory, metacognition, motivation, perception, problem solving, self-efficacy, spatial ability, symbolic learning, growth mindset
2. Math and Science Education	This chapter focuses on projects intended to impact or affect mathematics skills or science skills.	Algebra, computation, fractions, geometry, math difficulties, measurement, numeracy, probability, statistics, word problems, biology, chemistry, earth science, hands-on science, physics, science inquiry, scientific literacy
3. Reading, Writing, and Language Development	This chapter focuses on projects intended to impact or affect language skills in English, reading skills, and writing skills.	Grammar, morphology, prosody, language impairments, expressive or receptive oral language, pragmatics, beginning reading, comprehension, decoding, oral and silent reading, vocabulary, reading difficulties, beginning writing, content area writing, expository writing, writing difficulties, writing strategies
4. Other Academic Content Areas	This chapter focuses on projects intended to impact or affect learning in other academic categories.	Fine or performing arts, economics, foreign language, health, history, physical education, psychology, social studies, and sociology.

5. Social and Behavioral Outcomes	This chapter focuses on projects intended to impact or affect social-behavioral learning or skills. Projects focus on social behaviors and interactions with peers and teachers.	Affective behavior, aggression/disruptive behavior, behavior problems, character development or education, engagement, functional skills, interpersonal relationships, peer acceptance and relationships, on-task behavior, social and emotional learning, social-behavioral counseling, social behavior, and social competence/skills.
6. Postsecondary Education and Adult Education	This chapter focuses on projects intended to impact or affect pathways to postsecondary learning and on programs beyond the secondary level.	Transition to college/career, transition to independent learning, high school equivalency, college access and financial support, postsecondary curriculum, postsecondary remediation, postsecondary credit recovery, college retention and completion, the adult education system
7. Assistive Technology	This chapter focuses on projects intended to impact or affect student learning via assistive technology, or its use or availability for students with special needs.	Assistive technology/ devices, augmented technology/ devices, augmented/ alterative communication, screen enlargements, screen readers, voice recognition programs

The categorization scheme for the Technology to Support Teachers and Instructional Practice section and chapters are provided below.

Categorization Scheme for Technology to Support Teachers and Instructional Practice		
Chapter Headers	**Definition**	**Key Words**
1. Classroom Management and Instructional Supports	This chapter focuses on projects intended to impact or affect classroom management and classroom management techniques, as well as classroom teachers' methods and strategies for instruction, such as presenting instructional materials, conducting instructional activities, and technology that helps teachers implement interventions and teach subjects.	Lesson planning, accommodating learning, managing differentiation, personalizing learning, using digital teaching platforms, implementation supports, pedagogical/ instructional supports, productivity tools
2. Educator Professional Development	This chapter focuses on projects intended to impact or affect professional development programs and practices for currently practicing educators, the training of education students to become practicing educators, and the mentoring of educational professionals, including teachers and other direct service providers.	Teacher development, teacher training, teacher coaching, student teaching, instructional coaching, pedagogical or instructional improvements, pedagogical or instructional training

The categorization scheme for the Technology to Support Research and School Improvement section and chapters are provided below.

Categorization Scheme for Technology to Support Research and School Improvement		
Chapter Headers	**Definition**	**Key Words**
1. Tools for Researchers	This chapter focuses on projects intended to provide education researchers with the tools they need to conduct rigorous applied research, including single-subject design, quasi-experimental design, randomized controlled trials, psychometrics, power analysis, and "big data" use. Projects develop new approaches, extend and improve existing methods, and create other tools that would enhance the ability of researchers to conduct the types of research that the Institute funds.	Statistical analysis, research design, quasi-experimental design, survey methods, power analysis, experimental methods, data analysis, sampling methodology, psychometrics, analytic modeling
2. Technology for School Improvement	This chapter focuses on projects intended to impact or affect school planning, school-level data management, financial management tools, quality control systems, and providing supports for students with disabilities (not assistive technologies).	Data-based decisions making, early warning indicator system, education finance, education systems

Each project was coded by the contractor to indicate whether it explored, developed, or studied (e.g., evaluated) one or more of the following technology types: web-based (spider web icon), virtual environment and/or interactive simulation (viewer icon), intelligent tutor and/or artificial intelligence (tutor icon), game-based (chess icon), and computer-based assessments (checkmark icon). Blank cells indicate that no products of these specific types were developed or studied as part of the project. Institute staff verified the coding and provided additional documentation to resolve any remaining questions about coding when necessary. Some projects received multiple technology icons. For instance, if a project was developing a computer-based assessment, and this assessment featured game-based technologies to engage students, it would receive both a checkmark icon (computer-based assessments) and an chess icon (game-based).

The icons and definitions for each technology type identified in the project tables are provided below.

Technology	Icon	Definition
Web-based		Web-based technology includes devices or other applications which leverage access to the Internet, such as cloud computing which involves groups of remote servers, software networks that allow for centralized data storage and online access. Web-based technologies can be based completely online (e.g., a mobile application) or can be hybrids in which the technology has a mix of web-based and non-web-based components (e.g., computer software for which user data can be uploaded to Internet). Key words: cloud-based, Internet, online, streaming, web-based, cloud computing, remote servers, software networks, cloud engineering, cloud architecture.
Virtual environment / Interactive Simulation		Virtual environments are interactive, virtual image displays enhanced by visual, aural, and tactile modalities. Virtual environments allow users to "have a sense of being present in an environment other than the one they are actually in, and to interact with that environment". Interactive simulation is an imitation of a real-world process or system. It is designed to promote learning by allowing the user to actively control input parameters and observe the results on the system. Key words: interactive environment, interactive simulation, simulation, virtual environment, virtual world, virtual simulation, virtual classroom, virtual simulator, virtual event.

Intelligent Tutor / Artificial Intelligence		Intelligent tutors and artificial intelligence track the knowledge of the student or other user (called "user modeling") and adaptively respond to him or her. This incorporates computational models in artificial intelligence and cognitive science. Key words: adaptive tutor, artificial intelligence, cognitive tutor, computerized tutor, intelligent tutor, user modeling, computer-based agent, web-based tutor.
Game-based		Game-based technologies offer an instructional method that incorporates educational content or learning principals into a computer-based game (or a game played on other devices such as tablets or mobile phones). Game-based learning technologies often feature feedback, progress markers, engaging content, fantasy, competition, challenge, uncertainty, curiosity, control, and other factors that involve cognition, emotions, motivation, and art. Key words: games, computer games, game-based learning, learning games, video games, mobile games, educational games.
Computer-based Assessments		Computer-based assessments are assessments administered using tablets, computers, and other computing platforms. It also refers to computerized adaptive testing (CAT) (i.e., a form of computer-based testing that adapts to the user's ability/knowledge level by selecting questions from a pre-calibrated item bank). Assessment may be stand-alone or embedded in intelligent tutoring systems and game-based projects. Key words: computer-based testing/ assessment, computerized testing/ assessment, computer-adaptive testing/ assessment, IRT models.

Appendix B: Web-Based Technologies by Chapter

Projects are listed in alphanumeric order and may not match the order of presentation within the actual chapter.

Cognition

Award Number	Web-Based Technologies by Chapter
ED06PO0896	Computer-Enhanced Automated Lecture (CEAL)
EDIES10C0022	Growth Mindset Learning Platform for Educators and Students: Supporting Academic Motivation and Achievement through an Integrated Online Platform
EDIES11C0044	Computer Adaptive Triarchic Assessment and Instructional Activities for Early Childhood
EDIES14C0047	A Game-Based Intervention to Promote Executive Function and Reasoning in Early Learning
R305A090324	Creating Scalable Interventions for Enhancing Student Learning and Performance
R305A130699	The Impact of Theories of Intelligence on Self-Regulated Learning Strategies and Performance Improvement
R305B070537	Harnessing Retrieval Practice to Enhance Learning in Diverse Domains
R305H030016	The Neural Markers of Effective Learning
R305H030175	Study Enhancement Based on Principles of Cognitive Science
R305H050036	A Randomized Trial of Two Promising Interventions for Students with Attention Problems
R305H050038	Supporting Efficient and Durable Student Learning
R324B070176	Electronic Performance Support Systems (EPSS) as Assistive Technologies To Improve Outcomes for Secondary Students

Math and Science Education

Award Number	Web-Based Technologies by Chapter
ED008CO0050	Higher Learning @ Higher Speeds in Biosciences using Time Compressed Animated Delivery (TCAD)
ED06C00039	Cinematic Sciences: An Online Simulation Platform with Real Physics and Behavioral Programming for Physical Sciences
ED06PO0899	Videogame-Based Inquiry Learning Module for Science Literacy
ED06PO0900	A Virtual Launchpad for Learning at Higher Speeds
ED06PO0909	Virtual Physics Laboratory
ED06PO0912	Math Messenger

Award Number	Web-Based Technologies by Chapter
ED06PO0921	Natural Math: An Empirically Derived Software for Mathematics Education
ED06PO0930	Fathom Dynamic Data Software
ED07CO0037	Technology Enhanced Science Education in Middle School
ED07CO0038	The Tactus Immersive Learning Environment (TILE) for Enhancing Learning in High School Science Classrooms
ED07CO0039	Early Childhood Assessment and Intervention to Improve Grade School Students' Math and Reading
ED07CO0040	Virtual Physics Laboratory
ED07CO0044	Intelligent Molecular Model Kit and Software Suite for Improving High School Chemistry Instruction and Student Achievement
ED08CO0044	Online Learning System to Advance Teaching of Hyper Molecular Modeling
ED08CO0050	The Digital Earth Explorations Project to Enrich the Middle School Sciences
ED08CO0051	Electronic Chemistry Laboratory Workbook (ECLW)
EDIES09C0009	An Online Intelligent Tutoring System to Advance Learning in Math Games
EDIES09C0015	Math Monster Mystery: A Formative Assessment in Game Format for Grade 4 Mathematics
EDIES09C0017	Agile Mind Visualizations to Increase High School Biology Learning
EDIES09C0056	Refining and Validating the NimblePad
EDIES10C0023	Game-Based Interactive Life Science for Students With Learning Disabilities
EDIES10C0024	Perceptual and Adaptive Learning Technologies: Developing Products to Improve Algebra Learning
EDIES10P0102	Fablab Construction Station: Engaging Teacher and Students in Technology, Engineering, and Math
EDIES10P0103	Planet First Energy World (PFEW)
EDIES10P0104	An Empirical Approach to Developing Web-based Math Learning Games to Improve Elementary School Student Outcomes
EDIES11C0022	STEM Solar Explorations
EDIES11C0026	Project NumberShire: A Game-Based Integrated Learning and Assessment System to Target Whole Number Concepts
EDIES11C0028	Haptic Immersion Platform to Improve STEM Learning for the Visually Impaired
EDIES11C0029	Virtual Labs for High School Physics
EDIES11C0041	Math Education for Adult Learners and College Remediation Using Artificial Intelligence
EDIES12C0040	Possible Worlds: Explorer Series
EDIES13C0028	SciSkillQuest: A Standards-Based Game to Develop Students' Scientific Skills, Academic Mindsets, and Learning Strategies in Science
EDIES13C0032	Web Fluid Math

Award Number	Web-Based Technologies by Chapter
EDIES13C0033	Science4Us: Game-Based K-2 STEM Education For Teachers And Students
EDIES13C0037	Transmedia: Augmented Reality Game For Essential Transfer Of Science
EDIES13C0043	Empires: The First Socially-Networked Story-Based Math Game
EDIES13C0044	Teachley: Math Facts - Design And Development Of Intervention Software Promoting Single-Digit Operational Fluency
EDIES13C0045	NumberShire II: Development Of A Second Grade Game-Based Integrated Learning System To Target Whole Numbers And Operations In Base Ten And Operations And Operations And Algebraic Thinking
EDIES14C0025	S3: A Game-based 3rd Grade Math Curriculum
EDIES14C0041	Happy Atoms
EDIES14C0044	Eco: An Online Virtual World for Secondary School Environmental Literacy and Collaborative Problem Solving
EDIES14C0052	Engaging Students in STEM: International Social Collaborative Exchange Network for Education: iSCENE
R305A070067	Integrated Software for Artificial Intelligence Tutoring and Assessment in Science
R305A070440	Making Longitudinal Web-Based Assessments Give Cognitively Diagnostic Reports to Teachers, Parents, and Students While Employing Mastery Learning
R305A080063	A Randomized Controlled Study of the Effects of Intelligent Online Chemistry Tutors in Urban California School Districts
R305A080093	Bringing Cognitive Tutors to the Internet: A Website that Helps Middle-School Students Learn Math
R305A080141	Advancing Ecosystems Science Education via Situated Collaborative learning in Multi-User Virtual Environments
R305A080225	Multilevel Assessments of Science Standards (MASS)
R305A080464	Closing the Achievement Gap in Middle School Mathematics Utilizing Stanford University's Education Program for Gifted Youth Differentiated Mathematics Program
R305A080514	Virtual Performance Assessments for Measuring Student Achievement in Science
R305A080594	Guru: A Computer Tutor that Models Expert Human Tutors
R305A080614	SimScientists: Interactive Simulation-Based Science Learning Environments
R305A080622	Expanding the Science and Literacy Curricular Space: The GlobalEd 2 Project
R305A080664	Teaching Every Student: Using Intelligent Tutoring and Universal Design to Customize the Mathematics Curriculum
R305A090170	ASSISTment Meets Science Learning (AMSL)
R305A090195	Testing the Effectiveness of CALM for High School Chemistry Students

Award Number	Web-Based Technologies by Chapter
R305A090197	Efficacy Study of AnimalWatch: An Intelligent Tutoring System for Pre-Algebra
R305A090528	Applications of Intelligent Tutoring Systems (ITS) to Improve the Skill Levels of Students with Deficiencies in Mathematics
R305A090549	Promoting Robust Understanding of Genetics with a Cognitive Tutor that Integrates Conceptual Learning with Problem Solving
R305A100069	Embedded Assessments Using the ChemCollective Virtual Lab
R305A100074	Improving Students' Skill at Solving Equations Through Better Encoding of Algebraic Concepts
R305A100110	Developing and Evaluating a Technology-Based Fractions Intervention Program for Low-Achieving and At-Risk Students
R305A100163	Improving a Natural-Language Tutoring System that Engages Students in Deep Reasoning Dialogues about Physics
R305A100234	An Adaptive Testing System for Diagnosing Sources of Mathematics Difficulties
R305A100404	Promoting Transfer of the Control of Variables Strategy in Elementary and Middle School Children via Contextual Framing and Abstraction
R305A100782	Habitat Tracker: Learning About Scientific Inquiry Through Digital Journaling at Wildlife Centers
R305A110021	Voyage to Galapagos: Development of a Differentiated Assistance Model in an Inquiry Learning Environment
R305A110149	Assessing the Efficacy of Online Credit Recovery in Algebra I for At-Risk Ninth Graders
R305A110810	An Examination of the Qualities of Interactive Science Learning Environments That Promote Optimal Motivation and Learning
R305A120125	An Efficacy Study of Online Mathematics Homework Support: An Evaluation of the ASSISTments Formative Assessment and Tutoring Platform
R305A120186	SimSelf: A Simulation Environment Designed to Model and Scaffold Learners' Self-Regulation Skills to Optimize Complex Science Learning
R305A120288	Perceptual Learning Technology in Mathematics Education: Efficacy and Replication
R305A120390	SimScientists Assessment System
R305A120734	Combining Advantages of Collaborative and Individual Learning with an Intelligent Tutoring System for Fractions
R305A120778	The Development of an Intelligent Pedagogical Agent for Physical Science Inquiry Driven by Educational Data Mining
R305A130125	Using Computer-Assisted Instruction to Accelerate Students through Developmental Math: An Impact Study of Modularization and Compression

Award Number	Web-Based Technologies by Chapter
R305A130160	SimScientists Model Progressions
R305A130195	GlobalEd 2
R305A130215	Use of Machine Learning to Adaptively Select Activity Types and Enhance Student Learning with an Intelligent Tutoring System
R305A140221	Efficacy of ALEKS for Improving Student Algebra Achievement
R305A140340	Khan Academy Resources for Maximizing Mathematics Achievement: A Postsecondary Mathematics Efficacy Study
R305A140602	Bootstrapping Achievement and Motivation in STEM: An Integrated Cognitive-Motivational Intervention to Improve Biology Grades
R305B070048	Evaluation of the First In Math Online Mathematics Program in New York City: A Randomized Control Trial
R305B070325	mCLASS:Math: Development and Analysis of an Integrated Screening, Progress Monitoring, and Cognitive Assessment System for K-3 Mathematics
R305B070349	Acquiring Research Investigative and Evaluative Skills (ARIES) for Scientific Inquiry
R305B070430	Democratizing Access to Core Mathematics Grades 9-12
R305B070487	Bridging the Bridge to Algebra: Measuring and Optimizing the Influence of Prerequisite Skills on a Pre-Algebra Curriculum
R305C080015	National Research & Development Center on Instructional Technology: Center for Advanced Technology in Schools
R305C080022	National Research & Development Center on Instructional Technology: Possible Worlds
R305H020113	Introducing Desirable Difficulties for Educational Applications in Science
R305H050052	Dynamically Modifying the Learning Trajectories of Novices with Pedagogical Agents
R305H060034	Training in Experimental Design: Developing Scalable and Adaptive Computer-based Science Instruction
R305H060070	Integrating Conceptual Foundations in Mathematics through the Application of Principles of Perceptual Learning
R305K030140	Using Web-Based Cognitive Assessment Systems for Predicting Student Performance on State Exams
R305K040008	Integrated Software for Artificial Intelligence Tutoring and Assessment in Science
R305K050045	Classroom Connectivity in Promoting Mathematics and Science Achievement
R305K050157	Scaling Up TRIAD: Teaching Early Mathematics for Understanding with Trajectories and Technologies
R324A070035	Principled Science Assessment Designs for Students with Disabilities
R324A070130	The Universally Designed Science Notebook: An Intervention To Support

Award Number	Web-Based Technologies by Chapter
	Science Learning For Students With Disabilities
R324A090145	Building Math Readiness in Young Deaf/Hard-of-Hearing Children: Parents as Partners
R324A090340	The Math Learning Companion: An Individualized Intervention for Students with Math Learning Disabilities
R324A120006	AnimalWatch-VI Suite: A Comprehensive Program to Increase Access to Mathematics for Students with Visual Impairments
R324A120071	Development of a Game-based Integrated Learning and Assessment System to Target Whole Number Concepts (Project NumberShire)

Reading, Writing, and Language Development

Award Number	Web-Based Technologies by Chapter
ED06PO0904	Dynamic Offset of Text Highlighting to Build Reading Fluency
ED07CO0039	Early Childhood Assessment and Intervention to Improve Grade School Students' Math and Reading
ED07CO0043	4KW: A Multimedia System for Ensuring that Grade School Students Know the Meaning of the 4,000 Most Frequently Used English Words
EDIES09C0013	Word-Learning Strategies: A Program for Upper Elementary Readers
EDIES09C0018	Capitalizing on Social Networking: Social Networking Practices to Increase Adolescent Literacy Engagement and Achievement
EDIES10P0011	Developing a More Effective Speech Therapy Distance Learning Web-Based Product and Service
EDIES11C0019	u-learn.net: An Anywhere/Anytime Formative Assessment and Learning Feedback Environment
EDIES11C0027	Go Talk Phonics: Phonics for Individuals with Disabilities
EDIES11C0032	MyASL Quizmaker
EDIES11C0034	Artificial Intelligence Software to Tutor Literary Braille to the Blind and Visually Impaired
EDIES11C0042	Readorium Software for Improved Reading Comprehension of Non-fiction Science Text
EDIES13C0030	Readorium Rising Reader: Smart Nonfiction Comprehension Software For Students In Grades 3-5
EDIES13C0039	Infowriter: A Student Feedback And Formative Assessment Environment For Writing Information And Explanatory Texts
EDIES13C0040	World Explorador
EDIES14C0018	Access: Language Arts

Award Number	Web-Based Technologies by Chapter
EDIES14C0026	Commercializing the Effective K-3 Assessment to Instruction (A2i) Intervention to Reduce Cost and to Scale Access to the Benefit of More Students
EDIES14C0042	The Iowa Assessment of Skills and Knowledge for Automatic Word Recognition and Decoding (iASK)
EDIES14C0043	Enhancing Augmentative and Alternative Communication Rates in pre-K Through 6
EDIES14C0045	Automated, Personalized Formative Feedback for Student Writing with the LightSide Revision Assistant
EDIES14C0046	Technology-Enhanced Tutoring: Linking School and Home to Help Struggling Readers
R305A040056	National Research Center on Rural Education Support
R305A080133	Efficacy and Replication Research on the Intelligent Tutoring System for the Structure Strategy--Rural and Suburban Schools Grades 4, 5, 7, and 8
R305A080589	The Writing Pal: An Intelligent Tutoring System that Provides Interactive Writing Strategy Training
R305A090227	The ESTRELLAS Project: Electronic Supported Text Research for English Language Learner Academic Success
R305A090394	The Assess-as-You-Go Writing Assistant: A Student Work Environment that Brings Together Formative and Summative Assessment
R305A090476	STEPS to Literacy: An Integrated Digital Writing Space for English Language Learners
R305A090608	Assessing Online Reading Comprehension: The ORCA Project
R305A100261	Assessment of Comprehension in Older Struggling Readers
R305A110333	Creating Compositions Using a Technology-Based Writing Tool: Supporting Students With Universal Design for Learning
R305A120086	Computer Based Assessment System for Reading (CBAS-R): Skills Analysis and Progress Monitoring
R305A120593	Improving Reading Comprehension of Middle Grades English Language Learners by Combining Structure Strategy with Web-Based Adaptive Tutoring for EL Learners (SWELL)
R305A120707	Exploration of Automated Writing Strategy Instruction for Adolescent Writings Using The Writing Pal
R305A130460	BLOOM: Facilitating Language and Literacy Outcomes of English Language Learners
R305A130467	Developing an Online Tutor to Accelerate High School Vocabulary Learning
R305A130705	Development of a Web-Based Writing Partner (Strategic Writing Assisted by intelligent tutoring for 5th grade Youth (SWAY)) to Improve Writing Persuasive Essays for 5th Grade Students

Award Number	Web-Based Technologies by Chapter
R305A140185	Multiple-choice Online Cloze Comprehension Assessment (MOCCA): Refining and Validating a Measure of Individual Differences in Reading Comprehension Processes During Reading
R305C120001	Center for the Study of Adult Literacy (CSAL): Developing Instructional Approaches Suited to the Cognitive and Motivational Needs for Struggling Adults
R305F100027	Examining Effective Intervention Targets, Longitudinal Intensity, and Scaling Factors for Pre-K to 5th Grade Student Comprehension
R305G020018	Coh-Metrix: Automated Cohesion and Coherence Scores to Predict Text Readability and Facilitate Comprehension
R305G030072	Intelligent Tutoring Using The Structure Strategy To Improve Reading Comprehension Of Middle School Students
R305G030123	Reader-Specific Lexical Practice For Improved Reading Comprehension
R305G040046	iSTART: Interactive Strategy Trainer for Active Reading and Thinking
R305G040055	Assessing Reading Comprehension with Verbal Protocols and Latent Semantic Analysis
R305G050029	Improving Reading Comprehension for Struggling Readers: Understanding the Roles of Vocabulary Development, Guided Strategy Use, and Spanish Language Supports in a Digital Reading Environment
R305G050154	Developing Internet Comprehension Strategies Among Adolescent Students At Risk to Become Dropouts
R305H020039	Improving Students' Comprehension and Construction of Arguments
R305H050133	Creating a Usable Environment to Teach Argument Comprehension and Production Skills
R305S050010	An Independently Usable Multimedia Software System in Listening Comprehension and Auditory Repetition Priming for Intellectually Disabled Non-Readers
R324A080006	Project LIBERATE (Literacy Instruction Based on Evidence through Research for Adjudicated Teens to Excel)
R324A090038	Formative Assessment and Instrumentation Procedures for Reading
R324A100322	Project SAIL: Strategies for Academic Internet Learning
R324A120103	Reducing Special Education/Reading Risk for Urban Learners through An Oral Reading Fluency Intervention
R324A120365	The Effects of Online Decision Making Support for Home Visitors Using an RTI Approach to Promote the Language Development of At-risk Infants and Toddlers

Other Academic Content Areas

Award Number	Web-Based Technologies by Chapter
ED06PO0906	Give Me 5 For Children
ED06PO0936	A National PBS Television & Interactive New Technology Program for Children 7-11
ED07CO0046	Youth Map: A Software Based Program to Increase Service-Learning Quality
EDIES10C0020	OPEN's Virtual National Parks 3D Learning Environment for Science and Social Studies: Low-Cost and Easy to Implement Curriculums
EDIES10P0101	Online Socratic Learning for Enhanced Critical Thinking
EDIES10P0110	School Views (VIEWS): Volunteer, Internship, and Employment Web Solutions
EDIES12C0034	The American War Featuring Valley Sim
EDIES13C0027	Mission US: An Interactive Solution for Middle School History Learning
EDIES13C0035	Integrated System For Teaching And Assessing Online Information Research
EDIES13C0042	Go Games Civics: Meeting Common Core Standards with Tablet-Enhanced Multiplayer Role Play Games

Social and Behavioral Outcomes

Award Number	Web-Based Technologies by Chapter
ED06PO0910	Digitizing the K-8 Portion of the Positive Action Program for Web-Delivery
EDIES10P0106	My Personal Academic Plan
EDIES11C0033	A Computer-based Social Intervention for Students with High Functioning ASD: Using Technology to Improve Special Education
EDIES11C0039	An Interactive Social Tutoring System to Improve and Measure Social Goals for Students Related to Academic and Other School-Related Outcomes
EDIES12C0047	PEAT Communication Scheduler for Autism
EDIES13C0034	Dynamic Narrative Generation Software To Improve Social And Behavioral School Readiness Skills Needed For The Successful Transition To Grade School
EDIES13C0041	Hall Of Heroes: An Interactive Social Tutoring System To Improve And Measure Social Goals For Students In Preparation For Transition To Middle School
R305A110583	Interactive Social Tutoring System for Social Skills Training with Elementary Students
R324A080136	Development of an Intervention to Enhance the Social Competencies of Children with Asperger's/High Functioning Autism Spectrum Disorders
R324A090197	Developing a 3D-based Virtual Learning Environment for Use in Schools to Enhance the Social Competence of Youth with Autism Spectrum Disorder

Award Number	Web-Based Technologies by Chapter
R324A100094	iSKILLS : The Audio/Video Guidance Repository for Life Skills
R324A100246	Transition Success Assessment
R324A110074	Student Self-Management System (SSMS): Reducing Problem Behavior in Upper Elementary Classrooms by Transferring Externally Applied Teacher Controls to Internally Applied Student Controls
R324A120284	Early Intervention for Young Children with ADHD: Developing Strategies to Enhance Parent Engagement

Pathways Into and Through Postsecondary Education

Award Number	Web-Based Technologies by Chapter
EDIES13C0026	Dynamic E-Learning to Improve Postsecondary Transition Outcomes for Secondary Students with High Functioning Autism
R305A080263	Using High School Transcript Data to Improve Student Access to Four-Year Colleges
R305A110112	Evaluating the Success of Undergraduates in the U-Pace Intervention to Improve Academic Achievement for All Postsecondary Education Students
R305A110288	Strategizing for College: A Game-based Approach to Increasing College Access
R305A110809	Promoting College Enrollment among Disadvantaged Students: A Randomized Controlled Trial of Two Low-Cost Interventions
R324A090307	Transition Outcomes for Special Education Secondary Students: Project Choices

Assistive Technology

Award Number	Web-Based Technologies by Chapter
ED08CO0056	The Universal Assessment System (UAS)
EDIES11C0028	Haptic Immersion Platform to Improve STEM Learning for the Visually Impaired
EDIES11C0032	MyASL Quizmaker
EDIES11C0034	Artificial Intelligence Software to Tutor Literary Braille to the Blind and Visually Impaired
EDIES11C0040	iPrompt to Improve Teaching Students with ASD
EDIES12C0047	PEAT Communication Scheduler for Autism
EDIES14C0043	Enhancing Augmentative and Alternative Communication Rates in pre-K Through 6
R324A120006	AnimalWatch-VI Suite: A Comprehensive Program to Increase Access to Mathematics for Students with Visual Impairments

Award Number	Web-Based Technologies by Chapter
R324B070033	Development of an IFSP Form and Process to Maximize Learning Opportunities for Young Children with Disabilities
R324B070176	Electronic Performance Support Systems (EPSS) as Assistive Technologies To Improve Outcomes for Secondary Students

Instructional Supports and Tools for Classroom Management

Award Number	Web-Based Technologies by Chapter
ED06PO0908	The Virtual STAR Classroom Simulator
ED06PO0910	Digitizing the K-8 Portion of the Positive Action Program for Web-Delivery
ED06PO0918	The eServe Initiative: An Empirically Supported, Web-based Educational Decision Making Product
ED06PO0922	Data-Management Program
ED06PO0927	Development of a Process Methodology to Determine the Cost of Ownership of Instructional Resources in Relation to the Benefits of Improved Student Performance
ED08CO0044	Online Learning System to Advance Teaching of Hyper Molecular Modeling
EDIES09C0014	Online Application to Support Inquiry-based Science Teaching
EDIES10C0018	The Learning Element: A Lesson Planning and Curriculum Documentation Tool for Teachers
EDIES11C0040	iPrompt to Improve Teaching Students with ASD
EDIES11C0043	The Social Shape Up System
EDIES12C0035	myEdna: Web 2.0 Teacher Personal Assistant
EDIES13C0036	Virtual Research Assistant For Teachers
EDIES13C0038	Project Hi-Fi: Promoting High Fidelity Of Screening And Progress Monitoring Assessments
EDIES13C0046	Handheld Technology For Speech Development In Students With Autism Spectrum Disorders
EDIES14C0048	Socrative Learning Network
EDIES14C0049	Zaption Mobile: Develop and Testing a Mobile App for Video Learning
EDIES14C0050	The eSparkBeat: A Pulse on the Modern Classroom
EDIES14C0051	Expanding Supports for Data-Driven Language Instruction
R305A080231	The Diagnostic Geometry Assessment Project
R305A080667	Agent and Library Augmented Shared Knowledge Areas (ALASKA)
R305A100178	Making Room for Student Thinking: Using Automated Feedback, Video-Based Professional Development, and Evidence-Based Practice Recommendations to Improve Mathematical Discussions

Award Number	Web-Based Technologies by Chapter
R305A110306	Eliciting Mathematics Misconceptions (EM2): A Cognitive Diagnostic Assessment System
R305A120125	An Efficacy Study of Online Mathematics Homework Support: An Evaluation of the ASSISTments Formative Assessment and Tutoring Platform
R305A120217	Innovative Computer-Based Formative Assessment via a Development, Delivery, Scoring, and Report-Generative System
R305A130375	The Classroom Check-up: Supporting Elementary Teachers in Classroom Management Using a Web-based Coaching System
R305A130517	Making Individualized Literacy Instruction Available to All Teachers: Adapting the Assessment to Instruction (A2i) Software for Multiple Real-World Contexts
R305A140472	Linguistically-Informed Activity Generation Technology to Support English Learner Content Learning
R305B070074	Child-Instruction Interactions in Reading: Examining Causal Effects of Individualized Instruction in Second and Third Grade
R305G020018	Coh-Metrix: Automated Cohesion and Coherence Scores to Predict Text Readability and Facilitate Comprehension
R305H040099	Bridging the Gap: Applying Algebra Cognition Research to Develop and Validate Diagnostic Classroom Algebra Testlet
R305W020001	Scaling Up an Assessment-Driven Intervention Using the Internet and Hand-held Computers
R324A100014	Reliability and Validity Evidence for Progress Measures in Reading
R324A110262	Algebra Screening and Progress Monitoring
R324A130161	Decision Rule Research Project: Curriculum-Based Measurement in Reading
R324B070033	Development of an IFSP Form and Process to Maximize Learning Opportunities for Young Children with Disabilities

Educator Professional Development

Award Number	Web-Based Technologies by Chapter
ED06PO0902	Design of an Online Professional Development Resource for Mainstream Teachers of English Language Learners
ED06PO0933	From Assessment to Action
ED07CO0045	Developing a Web-based Classroom Observation System (COS) to Support Increased Teacher Quality
EDIES09C0012	An On-Line Professional Development Program for FluidMath
EDIES10C0022	Growth Mindset Learning Platform for Educators and Students: Supporting Academic Motivation and Achievement through an Integrated Online Platform

Award Number	Web-Based Technologies by Chapter
EDIES11C0045	PlatinuMath: An Online Formative Assessment Math Game for Preservice Elementary Teachers
R305A040056	National Research Center on Rural Education Support
R305A080078	Leadership for Integrated Middle-School Science (LIMSS)
R305A080295	Development of an Interactive, Multimedia Assessment of Teachers' Knowledge of Early Reading
R305A090107	Establishing Positive Behavior Supports in Elementary School Instructional Settings
R305A090145	INSPIRE: Urban Teaching Fellows Program
R305A100091	Accessible Professional Development for Teaching Aquatic Science Inquiry
R305A100105	A Technology-Rich Teacher Professional Development Intervention that Supports Content-Based Curriculum Development for English Language Learners
R305A100154	Development of an Online Course to Improve Teachers' Use of Effective Teacher-Child Interactions During Delivery of Early Literacy and Language Instruction
R305A100367	Increasing Adolescent Engagement, Motivation, and Achievement: Efficacy of a Web-Based, Teacher Professional Development Model
R305A100654	The Targeted Reading Intervention: A Web-Based Professional Development Program Targeting K-1 Classroom Teachers and their Struggling Readers
R305A110090	Developing Guidelines for Optimizing Levels of Students' Overt Engagement Activities
R305A110913	Strengthening School Leaders' Instructional Leadership Practice Through Developing Teachers' Abilities to Integrate Technology in Support of Student Learning
R305A120323	Using Validated Measures of Children's Engagement with Teachers, Peers, and Tasks to Guide Teachers' Response Toward Children with Emotional and Behavioral Challenges
R305A120526	Early Truancy Prevention Project
R305A140378	Scalable Approaches for Preparing Early Childhood Teachers: Identifying Costs and Effectiveness of Evidence Based Approaches to Coaching
R305A140386	Internet Implementation of Empirically-Supported Interventions that can be Remotely Delivered in Authentic Preschool Programs for Mothers and Teachers: Evaluation of Direct Child and Teacher Outcomes
R305H040013	Child Instruction Interactions in Early Reading: Examining Causal Effects of Individualized Instruction
R305K050045	Classroom Connectivity in Promoting Mathematics and Science Achievement
R305M040086	Can Literacy Professional Development be Improved with Web-based Collaborative learning Tools: A Randomized Field Trial

Award Number	Web-Based Technologies by Chapter
R305M040167	Professional Development in Early Reading (Classroom Links to Early Literacy)
R305M050021	Teaching Teachers to Teach Critical Reading Strategies (CREST) through an Intensive Professional Development Model
R305M050026	Examining the Efficacy of Two Models of Preschool Professional Development in Language and Literacy
R305M060057	Using Video Clips of Classroom Instruction as Item Prompts to Measure Teacher Knowledge of Teaching Mathematics: Instrument Development and Validation
R305W030257	Scaling-up Effective Intervention for Preventing Reading Difficulties in Young Children
R324A070008	Impact of Professional Development on Preschool Teachers' Use of Embedded-Instruction Practices
R324A080150	Online Teacher Training: Promoting Student Social Competence to Improve Academic and Behavioral Outcomes in Grades K-3
R324A090283	Professional Development that is Systemic, Focused on Teacher Growth, Incorporates Coaching, Collaboration, Cohorts, and Increased Knowledge to Create Student Success
R324A100196	Prime Online: Teacher Pedagogical Content Knowledge and Research-based Practice in Inclusive Elementary Mathematics Classrooms
R324A110131	Using Data to Foster the School Success of Students with Disabilities
R324A120081	Implementing the Common Core State Standards for Students with Disabilities: Research and Development of Web-based Supports for IEP Team Decision
R324A130249	Supporting Young Children's School Readiness and Reduced Challenging Behaviors: An Online Course to Enhance Toddler Teacher-Child Interactions
R324J060002	IEP Quality Improvement: Research and Development of Web-based Decision Support

Technology for School Improvement

Award Number	Web-Based Technologies by Chapter
ED06PO0913	Differentiated Placement Quality Control Model
ED06PO0915	Study of Educational Improvement Planning System Feasibility for Promoting Effective School Improvement and Planning
ED06PO0917	Student Outcomes Analysis Reporting (SOAR) Server
ED06PO0918	The eServe Initiative: An Empirically Supported, Web-based Educational Decision Making Product

Award Number	Web-Based Technologies by Chapter
ED06PO0925	Data Services Model to Support Effective Management, Analysis, and Use of Data
ED06PO0928	Education Data Management System
ED08CO0055	MeasureResults: A Web-based Tool To Support School Administrators in Conducting Analyses
R305A080263	Using High School Transcript Data to Improve Student Access to Four-Year Colleges
R305A100630	Strategic School Funding for Results Project, Phase II
R305E090005	A Proposal to Measure the Impact of Indiana's System of Diagnostic Assessments on Student Achievement Outcomes
R305S050040	School Forward Tracker: An Online Tool to Help Schools Implement and Monitor Action Plans for School Improvement
R324B070003	TEIDS Plus: Integrating Quality Assurance and Data-Based Decision Making To Enhance IFSP Quality, Implementation, and Child and Family Outcomes

Appendix C: Virtual Environments / Interactive Simulations by Chapter

Projects are listed in alphanumeric order and may not match the order of presentation within the actual chapter.

Cognition

Award Number	Virtual Environments / Interactive Simulations by Chapter
EDIES10C0022	Growth Mindset Learning Platform for Educators and Students: Supporting Academic Motivation and Achievement through an Integrated Online Platform
EDIES14C0047	A Game-Based Intervention to Promote Executive Function and Reasoning in Early Learning
R305A090324	Creating Scalable Interventions for Enhancing Student Learning and Performance
R305H060089	A Learning by Teaching Approach to Help Students Develop Self-Regulatory Skills in Middle School Science Classrooms
R324A120168	Virtual Reality Applications for the Study of Attention and Learning in Children with Autism and ADHD

Math and Science Education

Award Number	Virtual Environments / Interactive Simulations by Chapter
ED06C00039	Cinematic Sciences: An Online Simulation Platform with Real Physics and Behavioral Programming for Physical Sciences
ED06PO0899	Videogame-Based Inquiry Learning Module for Science Literacy
ED06PO0900	A Virtual Launchpad for Learning at Higher Speeds
ED06PO0909	Virtual Physics Laboratory
ED06PO0912	Math Messenger
ED06PO0921	Natural Math: An Empirically Derived Software for Mathematics Education
ED07CO0037	Technology Enhanced Science Education in Middle School
ED07CO0038	The Tactus Immersive Learning Environment (TILE) for Enhancing Learning in High School Science Classrooms
ED07CO0040	Virtual Physics Laboratory
ED07CO0044	Intelligent Molecular Model Kit and Software Suite for Improving High School Chemistry Instruction and Student Achievement
ED08CO0044	Online Learning System to Advance Teaching of Hyper Molecular Modeling
ED08CO0050	The Digital Earth Explorations Project to Enrich the Middle School Sciences

Award Number	Virtual Environments / Interactive Simulations by Chapter
ED08CO0051	Electronic Chemistry Laboratory Workbook (ECLW)
EDIES09C0017	Agile Mind Visualizations to Increase High School Biology Learning
EDIES10P0102	Fablab Construction Station: Engaging Teacher and Students in Technology, Engineering, and Math
EDIES10P0103	Planet First Energy World (PFEW)
EDIES10P0104	An Empirical Approach to Developing Web-based Math Learning Games to Improve Elementary School Student Outcomes
EDIES11C0022	STEM Solar Explorations
EDIES11C0026	Project NumberShire: A Game-Based Integrated Learning and Assessment System to Target Whole Number Concepts
EDIES11C0028	Haptic Immersion Platform to Improve STEM Learning for the Visually Impaired
EDIES11C0029	Virtual Labs for High School Physics
EDIES12C0040	Possible Worlds: Explorer Series
EDIES13C0028	SciSkillQuest: A Standards-Based Game to Develop Students' Scientific Skills, Academic Mindsets, and Learning Strategies in Science
EDIES13C0033	Science4Us: Game-Based K-2 STEM Education For Teachers And Students
EDIES13C0037	Transmedia: Augmented Reality Game For Essential Transfer Of Science
EDIES13C0043	Empires: The First Socially-Networked Story-Based Math Game
EDIES13C0045	NumberShire II: Development Of A Second Grade Game-Based Integrated Learning System To Target Whole Numbers And Operations In Base Ten And Operations And Operations And Algebraic Thinking
EDIES14C0041	Happy Atoms
EDIES14C0044	Eco: An Online Virtual World for Secondary School Environmental Literacy and Collaborative Problem Solving
EDIES14C0052	Engaging Students in STEM: International Social Collaborative Exchange Network for Education: iSCENE
R305A080141	Advancing Ecosystems Science Education via Situated Collaborative learning in Multi-User Virtual Environments
R305A080507	Scaffolding Students' Use of Multiple Representations for Science Learning
R305A080514	Virtual Performance Assessments for Measuring Student Achievement in Science
R305A080594	Guru: A Computer Tutor that Models Expert Human Tutors
R305A080614	SimScientists: Interactive Simulation-Based Science Learning Environments
R305A080622	Expanding the Science and Literacy Curricular Space: The GlobalEd 2I Project
R305A090170	ASSISTment Meets Science Learning (AMSL)
R305A090197	Efficacy Study of AnimalWatch: An Intelligent Tutoring System for Pre-Algebra

Award Number	Virtual Environments / Interactive Simulations by Chapter
R305A090210	Systems and Cycles: Using Structure-Behavior-Function Thinking as a Conceptual Tool for Understanding Complex Natural Systems in Middle School Science
R305A090519	Learning by Teaching Synthetic Student: Using SimStudent to Study the Effect of Tutor Learning
R305A100069	Embedded Assessments Using the ChemCollective Virtual Lab
R305A100110	Developing and Evaluating a Technology-Based Fractions Intervention Program for Low-Achieving and At-Risk Students
R305A100267	Mathemantics Preschool --> 3: Development and Evaluation of Mathematics Software for Children from Preschool to Grade 3
R305A100992	The Connected Chemistry Curriculum
R305A110021	Voyage to Galapagos: Development of a Differentiated Assistance Model in an Inquiry Learning Environment
R305A110060	Learning the Visual Structure of Algebra Through Dynamic Interactions with Notation
R305A110782	Explanation and Prediction Increasing Gains and Metacognition (EPIGAME)
R305A110810	An Examination of the Qualities of Interactive Science Learning Environments That Promote Optimal Motivation and Learning
R305A120047	Cyber-enabled Tangible Molecular Models for High School
R305A120186	SimSelf: A Simulation Environment Designed to Model and Scaffold Learners' Self-Regulation Skills to Optimize Complex Science Learning
R305A120390	SimScientists Assessment System
R305A120778	The Development of an Intelligent Pedagogical Agent for Physical Science Inquiry Driven by Educational Data Mining
R305A130016	Connecting Mathematical Ideas through Animated Multimodal Instruction
R305A130160	SimScientists Model Progressions
R305A130195	GlobalEd 2
R305A140117	Technology-interactive Classroom-embedded Modules for Measuring Challenging Math and Science Skills of ELs
R305B070349	Acquiring Research Investigative and Evaluative Skills (ARIES) for Scientific Inquiry
R305C080022	National Research & Development Center on Instructional Technology: Possible Worlds
R305H020113	Introducing Desirable Difficulties for Educational Applications in Science
R305H050052	Dynamically Modifying the Learning Trajectories of Novices with Pedagogical Agents
R305H050116	Grounded and Transferable Knowledge of Complex Systems Using Computer Simulations

Award Number	Virtual Environments / Interactive Simulations by Chapter
R305H050169	An Implementation of Vicarious Learning with Deep-Level Reasoning Questions in Middle School and High School Classrooms
R305H060034	Training in Experimental Design: Developing Scalable and Adaptive Computer-based Science Instruction
R305K050086	AnimalWatch: An Intelligent Tutoring System for Grade 6 Mathematics
R305K050140	Molecules and Minds: Optimizing Simulations for Chemistry Education
R305S050019	V-Frog: Applying Virtual Surgery Principles to Dissection Simulation
R324A120071	Development of a Game-based Integrated Learning and Assessment System to Target Whole Number Concepts (Project NumberShire)

Reading, Writing, and Language Development

Award Number	Virtual Environments / Interactive Simulations by Chapter
EDIES11C0042	Readorium Software for Improved Reading Comprehension of Non-fiction Science Text
R305F100005	Assessing Reading for Understanding: A Theory-based, Developmental Approach
R324A090038	Formative Assessment and Instrumentation Procedures for Reading

Other Academic Content Areas

Award Number	Virtual Environments / Interactive Simulations by Chapter
ED06PO0906	Give Me 5 For Children
EDIES10C0020	OPEN's Virtual National Parks 3D Learning Environment for Science and Social Studies: Low-Cost and Easy to Implement Curriculums
EDIES12C0034	The American War Featuring Valley Sim
EDIES13C0027	Mission US: An Interactive Solution for Middle School History Learning
EDIES13C0035	Integrated System For Teaching And Assessing Online Information Research

Social and Behavioral Outcomes

Award Number	Virtual Environments / Interactive Simulations by Chapter
EDIES11C0033	A Computer-based Social Intervention for Students with High Functioning ASD: Using Technology to Improve Special Education
EDIES11C0039	An Interactive Social Tutoring System to Improve and Measure Social Goals for Students Related to Academic and Other School-Related Outcomes

Award Number	Virtual Environments / Interactive Simulations by Chapter
EDIES13C0034	Dynamic Narrative Generation Software To Improve Social And Behavioral School Readiness Skills Needed For The Successful Transition To Grade School
EDIES13C0041	Hall Of Heroes: An Interactive Social Tutoring System To Improve And Measure Social Goals For Students In Preparation For Transition To Middle School
R305A110583	Interactive Social Tutoring System for Social Skills Training with Elementary Students
R324A090197	Developing a 3D-based Virtual Learning Environment for Use in Schools to Enhance the Social Competence of Youth with Autism Spectrum Disorder

Pathways Into and Through Postsecondary Education

Award Number	Virtual Environments / Interactive Simulations by Chapter
EDIES13C0026	Dynamic E-Learning to Improve Postsecondary Transition Outcomes for Secondary Students with High Functioning Autism

Assistive Technology

Award Number	Virtual Environments / Interactive Simulations by Chapter
EDIES11C0028	Haptic Immersion Platform to Improve STEM Learning for the Visually Impaired

Instructional Supports and Tools for Classroom Management

Award Number	Virtual Environments / Interactive Simulations by Chapter
ED06PO0908	The Virtual STAR Classroom Simulator
ED08CO0044	Online Learning System to Advance Teaching of Hyper Molecular Modeling
R305A080507	Scaffolding Students' Use of Multiple Representations for Science Learning

Educator Professional Development

Award Number	Virtual Environments / Interactive Simulations by Chapter
EDIES10C0022	Growth Mindset Learning Platform for Educators and Students: Supporting Academic Motivation and Achievement through an Integrated Online Platform

Award Number	Virtual Environments / Interactive Simulations by Chapter
R305A100110	Developing and Evaluating a Technology-Based Fractions Intervention Program for Low-Achieving and At-Risk Students
R324A080150	Online Teacher Training: Promoting Student Social Competence to Improve Academic and Behavioral Outcomes in Grades K-3

Appendix D: Intelligent Tutor / Artificial Intelligence Technologies by Chapter

Projects are listed in alphanumeric order and may not match the order of presentation within the actual chapter.

Cognition

Award Number	Intelligent Tutor / Artificial Intelligence Technologies by Chapter
ED06PO0896	Computer-Enhanced Automated Lecture (CEAL)
EDIES11C0044	Computer Adaptive Triarchic Assessment and Instructional Activities for Early Childhood
R305B070537	Harnessing Retrieval Practice to Enhance Learning in Diverse Domains
R305H030016	The Neural Markers of Effective Learning
R305H030175	Study Enhancement Based on Principles of Cognitive Science
R305H050036	A Randomized Trial of Two Promising Interventions for Students with Attention Problems
R305H050038	Supporting Efficient and Durable Student Learning
R305H060089	A Learning by Teaching Approach to Help Students Develop Self-Regulatory Skills in Middle School Science Classrooms

Math and Science Education

Award Number	Intelligent Tutor / Artificial Intelligence Technologies by Chapter
ED07CO0039	Early Childhood Assessment and Intervention to Improve Grade School Students' Math and Reading
ED07CO0044	Intelligent Molecular Model Kit and Software Suite for Improving High School Chemistry Instruction and Student Achievement
ED08CO0044	Online Learning System to Advance Teaching of Hyper Molecular Modeling
EDIES09C0009	An Online Intelligent Tutoring System to Advance Learning in Math Games
EDIES09C0015	Math Monster Mystery: A Formative Assessment in Game Format for Grade 4 Mathematics
EDIES10C0024	Perceptual and Adaptive Learning Technologies: Developing Products to Improve Algebra Learning
EDIES10P0104	An Empirical Approach to Developing Web-based Math Learning Games to Improve Elementary School Student Outcomes
EDIES11C0041	Math Education for Adult Learners and College Remediation Using Artificial Intelligence

Award Number	Intelligent Tutor / Artificial Intelligence Technologies by Chapter
EDIES13C0044	Teachley: Math Facts - Design And Development Of Intervention Software Promoting Single-Digit Operational Fluency
EDIES13C0045	NumberShire II: Development Of A Second Grade Game-Based Integrated Learning System To Target Whole Numbers And Operations In Base Ten And Operations And Operations And Algebraic Thinking
R305A070067	Integrated Software for Artificial Intelligence Tutoring and Assessment in Science
R305A070185	Effectiveness of Cognitive Tutor Algebra One Implemented at Scale
R305A070440	Making Longitudinal Web-Based Assessments Give Cognitively Diagnostic Reports to Teachers, Parents, and Students While Employing Mastery Learning
R305A080063	A Randomized Controlled Study of the Effects of Intelligent Online Chemistry Tutors in Urban California School Districts
R305A080093	Bringing Cognitive Tutors to the Internet: A Website that Helps Middle-School Students Learn Math
R305A080594	Guru: A Computer Tutor that Models Expert Human Tutors
R305A080664	Teaching Every Student: Using Intelligent Tutoring and Universal Design to Customize the Mathematics Curriculum
R305A090170	ASSISTment Meets Science Learning (AMSL)
R305A090197	Efficacy Study of AnimalWatch: An Intelligent Tutoring System for Pre-Algebra
R305A090460	Adapterrex: Exploring the Learning Benefits of Erroneous Examples and their Dynamic Adaptations within the Context of Middle School Mathematics
R305A090519	Learning by Teaching Synthetic Student: Using SimStudent to Study the Effect of Tutor Learning
R305A090528	Applications of Intelligent Tutoring Systems (ITS) to Improve the Skill Levels of Students with Deficiencies in Mathematics
R305A090549	Promoting Robust Understanding of Genetics with a Cognitive Tutor that Integrates Conceptual Learning with Problem Solving
R305A100074	Improving Students' Skill at Solving Equations Through Better Encoding of Algebraic Concepts
R305A100109	A Theory-Driven Search for the Optimal Conditions of Instructional Guidance in Algebra Tutor
R305A100110	Developing and Evaluating a Technology-Based Fractions Intervention Program for Low-Achieving and At-Risk Students
R305A100163	Improving a Natural-Language Tutoring System that Engages Students in Deep Reasoning Dialogues about Physics
R305A100267	Mathemantics Preschool --> 3: Development and Evaluation of Mathematics Software for Children from Preschool to Grade 3

Award Number	Intelligent Tutor / Artificial Intelligence Technologies by Chapter
R305A100404	Promoting Transfer of the Control of Variables Strategy in Elementary and Middle School Children via Contextual Framing and Abstraction
R305A100875	DeepTutor: An Intelligent Tutoring System Based on Deep Language and Discourse Processing and Advanced Tutoring Strategies
R305A110021	Voyage to Galapagos: Development of a Differentiated Assistance Model in an Inquiry Learning Environment
R305A120125	An Efficacy Study of Online Mathematics Homework Support: An Evaluation of the ASSISTments Formative Assessment and Tutoring Platform
R305A120186	SimSelf: A Simulation Environment Designed to Model and Scaffold Learners' Self-Regulation Skills to Optimize Complex Science Learning
R305A120734	Combining Advantages of Collaborative and Individual Learning with an Intelligent Tutoring System for Fractions
R305A120778	The Development of an Intelligent Pedagogical Agent for Physical Science Inquiry Driven by Educational Data Mining
R305A130160	SimScientists Model Progressions
R305A130206	My Science Tutor: Improving Science Learning through Tutorial Dialogs (MyST)
R305A130215	Use of Machine Learning to Adaptively Select Activity Types and Enhance Student Learning with an Intelligent Tutoring System
R305A130400	Efficacy of an Integrated Digital Elementary School Mathematics Curriculum
R305A130441	Exploring Studies to Derive Policies for Adaptive Natural-language Tutoring in Physics
R305A140221	Efficacy of ALEKS for Improving Student Algebra Achievement
R305B070349	Acquiring Research Investigative and Evaluative Skills (ARIES) for Scientific Inquiry
R305B070434	Improving Science Learning Through Tutorial Dialogs
R305B070487	Bridging the Bridge to Algebra: Measuring and Optimizing the Influence of Prerequisite Skills on a Pre-Algebra Curriculum
R305H050052	Dynamically Modifying the Learning Trajectories of Novices with Pedagogical Agents
R305H050169	An Implementation of Vicarious Learning with Deep-Level Reasoning Questions in Middle School and High School Classrooms
R305H060034	Training in Experimental Design: Developing Scalable and Adaptive Computer-based Science Instruction
R305K030140	Using Web-Based Cognitive Assessment Systems for Predicting Student Performance on State Exams
R305K040008	Integrated Software for Artificial Intelligence Tutoring and Assessment in Science

Award Number	Intelligent Tutor / Artificial Intelligence Technologies by Chapter
R305K050086	AnimalWatch: An Intelligent Tutoring System for Grade 6 Mathematics

Reading, Writing, and Language Development

Award Number	Intelligent Tutor / Artificial Intelligence Technologies by Chapter
ED07CO0039	Early Childhood Assessment and Intervention to Improve Grade School Students' Math and Reading
ED07CO0043	4KW: A Multimedia System for Ensuring that Grade School Students Know the Meaning of the 4,000 Most Frequently Used English Words
EDIES11C0034	Artificial Intelligence Software to Tutor Literary Braille to the Blind and Visually Impaired
EDIES11C0042	Readorium Software for Improved Reading Comprehension of Non-fiction Science Text
EDIES14C0026	Commercializing the Effective K-3 Assessment to Instruction (A2i) Intervention to Reduce Cost and to Scale Access to the Benefit of More Students
EDIES14C0043	Enhancing Augmentative and Alternative Communication Rates in pre-K Through 6
EDIES14C0045	Automated, Personalized Formative Feedback for Student Writing with the LightSide Revision Assistant
EDIES14C0046	Technology-Enhanced Tutoring: Linking School and Home to Help Struggling Readers
R305A080133	Efficacy and Replication Research on the Intelligent Tutoring System for the Structure Strategy--Rural and Suburban Schools Grades 4, 5, 7, and 8
R305A080157	Developing Vocabulary in an Automated Reading Tutor
R305A080589	The Writing Pal: An Intelligent Tutoring System that Provides Interactive Writing Strategy Training
R305A080596	Explicit Scaffolding for Word Learning in Context through Multimedia Word Annotation
R305A080628	Accelerating Fluency Development in an Automated Reading Tutor
R305A120370	Intelligent Scaffolding for Peer Reviews of Writing
R305A120593	Improving Reading Comprehension of Middle Grades English Language Learners by Combining Structure Strategy with Web-Based Adaptive Tutoring for EL Learners (SWELL)
R305A120707	Exploration of Automated Writing Strategy Instruction for Adolescent Writings Using The Writing Pal
R305A120811	Burst: Reading Efficacy Study

Award Number	Intelligent Tutor / Artificial Intelligence Technologies by Chapter
R305A130124	Exploring the Educational Game Landscape through Focused Studies and Ecological Interventions
R305A130467	Developing an Online Tutor to Accelerate High School Vocabulary Learning
R305A130705	Development of a Web-Based Writing Partner (Strategic Writing Assisted by intelligent tutoring for 5th grade Youth (SWAY)) to Improve Writing Persuasive Essays for 5th Grade Students
R305A140065	Individual Growth and Development Indicators: Automated Applications for Performance Evaluation of Early Literacy (IGDI-APEL)
R305A140471	English Learner Vocabulary Acquisition (ELVA): Promoting the Vocabulary and Language Proficiency of Spanish Speaking English Learners in Second Grade
R305B070458	Explicit Comprehension Instruction in an Automated Reading Tutor that Listens
R305C120001	Center for the Study of Adult Literacy (CSAL): Developing Instructional Approaches Suited to the Cognitive and Motivational Needs for Struggling Adults
R305G030072	Intelligent Tutoring Using The Structure Strategy To Improve Reading Comprehension Of Middle School Students
R305G030123	Reader-Specific Lexical Practice for Improved Reading Comprehension
R305G040046	iSTART: Interactive Strategy Trainer for Active Reading and Thinking
R305S050010	An Independently Usable Multimedia Software System in Listening Comprehension and Auditory Repetition Priming for Intellectually Disabled Non-Readers
R324A070196	CopyCat: Learning Through Signing
R324A080006	Project LIBERATE (Literacy Instruction Based on Evidence through Research for Adjudicated Teens to Excel)
R324A100322	Project SAIL: Strategies for Academic Internet Learning
R324A120103	Reducing Special Education/Reading Risk for Urban Learners through An Oral Reading Fluency Intervention

Other Academic Content Areas

Award Number	Intelligent Tutor / Artificial Intelligence Technologies by Chapter
EDIES10P0101	Online Socratic Learning for Enhanced Critical Thinking

Social and Behavioral Outcomes

Award Number	Intelligent Tutor / Artificial Intelligence Technologies by Chapter
EDIES10P0106	My Personal Academic Plan
EDIES11C0039	An Interactive Social Tutoring System to Improve and Measure Social Goals for Students Related to Academic and Other School-Related Outcomes
EDIES13C0041	Hall Of Heroes: An Interactive Social Tutoring System To Improve And Measure Social Goals For Students In Preparation For Transition To Middle School
R305A110583	Interactive Social Tutoring System for Social Skills Training with Elementary Students
R324A130216	Efficacy of a Comprehensive School-Based Intervention for Children with High-Functioning Autism Spectrum Disorders (HFASDs)

Pathways Into and Through Postsecondary Education

Award Number	Intelligent Tutor / Artificial Intelligence Technologies by Chapter
EDIES13C0026	Dynamic E-Learning to Improve Postsecondary Transition Outcomes for Secondary Students with High Functioning Autism

Assistive Technology

Award Number	Intelligent Tutor / Artificial Intelligence Technologies by Chapter
EDIES11C0034	Artificial Intelligence Software to Tutor Literary Braille to the Blind and Visually Impaired
EDIES14C0043	Enhancing Augmentative and Alternative Communication Rates in pre-K Through 6

Instructional Supports and Tools for Classroom Management

Award Number	Intelligent Tutor / Artificial Intelligence Technologies by Chapter
ED08CO0044	Online Learning System to Advance Teaching of Hyper Molecular Modeling
R305A080667	Agent and Library Augmented Shared Knowledge Areas (ALASKA)
R305A120125	An Efficacy Study of Online Mathematics Homework Support: An Evaluation of the ASSISTments Formative Assessment and Tutoring Platform
R305A130030	Automating the Measurement and Assessment of Classroom Discourse

Educator Professional Development

Award Number	Intelligent Tutor / Artificial Intelligence Technologies by Chapter
EDIES11C0045	PlatinuMath: An Online Formative Assessment Math Game for Preservice Elementary Teachers
R305A100105	A Technology-Rich Teacher Professional Development Intervention that Supports Content-Based Curriculum Development for English Language Learners
R305A100110	Developing and Evaluating a Technology-Based Fractions Intervention Program for Low-Achieving and At-Risk Students

Appendix E: Game-Based Technologies by Chapter

Projects are listed in alphanumeric order and may not match the order of presentation within the actual chapter.

Cognition

Award Number	Game-Based Technologies by Chapter
EDIES14C0047	A Game-Based Intervention to Promote Executive Function and Reasoning in Early Learning
R305A090100	An Efficacy Study of Two Computer-Based Attention Training Systems in Schools
R305H030175	Study Enhancement Based on Principles of Cognitive Science
R305H060161	The Effect of Metacognition on Children's Control of Their Study and of Their Cognitive Processes
R324A090164	Training Working Memory and Executive Control in Attention Deficit/Hyperactivity Disordered Children
R324A120168	Virtual Reality Applications for the Study of Attention and Learning in Children with Autism and ADHD

Math and Science Education

Award Number	Game-Based Technologies by Chapter
ED06C00039	Cinematic Sciences: An Online Simulation Platform with Real Physics and Behavioral Programming for Physical Sciences
ED06PO0899	Videogame-Based Inquiry Learning Module for Science Literacy
ED08CO0050	The Digital Earth Explorations Project to Enrich the Middle School Sciences
EDIES09C0009	An Online Intelligent Tutoring System to Advance Learning in Math Games
EDIES09C0015	Math Monster Mystery: A Formative Assessment in Game Format for Grade 4 Mathematics
EDIES10C0023	Game-Based Interactive Life Science for Students With Learning Disabilities
EDIES10P0104	An Empirical Approach to Developing Web-based Math Learning Games to Improve Elementary School Student Outcomes
EDIES11C0026	Project NumberShire: A Game-Based Integrated Learning and Assessment System to Target Whole Number Concepts
EDIES12C0040	Possible Worlds: Explorer Series
EDIES13C0028	SciSkillQuest: A Standards-Based Game to Develop Students' Scientific Skills, Academic Mindsets, and Learning Strategies in Science
EDIES13C0033	Science4Us: Game-Based K-2 STEM Education For Teachers And Students

Award Number	Game-Based Technologies by Chapter
EDIES13C0037	Transmedia: Augmented Reality Game For Essential Transfer Of Science
EDIES13C0043	Empires: The First Socially-Networked Story-Based Math Game
EDIES13C0044	Teachley: Math Facts - Design And Development Of Intervention Software Promoting Single-Digit Operational Fluency
EDIES13C0045	NumberShire II: Development Of A Second Grade Game-Based Integrated Learning System To Target Whole Numbers And Operations In Base Ten And Operations And Operations And Algebraic Thinking
EDIES14C0025	S3: A Game-based 3rd Grade Math Curriculum
EDIES14C0044	Eco: An Online Virtual World for Secondary School Environmental Literacy and Collaborative Problem Solving
R305A080479	Fostering Fluency With Basic Addition and Subtraction
R305A090527	Spatial Temporal Mathematics at Scale: An Innovative and Fully Developed Paradigm to Boost Math Achievement Among All Learners
R305A110782	Explanation and Prediction Increasing Gains and Metacognition (EPIGAME)
R305A130400	Efficacy of an Integrated Digital Elementary School Mathematics Curriculum
R305B070048	Evaluation of the First In Math Online Mathematics Program in New York City: A Randomized Control Trial
R305B070349	Acquiring Research Investigative and Evaluative Skills (ARIES) for Scientific Inquiry
R305C080015	National Research & Development Center on Instructional Technology: Center for Advanced Technology in Schools
R305C080022	National Research & Development Center on Instructional Technology: Possible Worlds
R305K050082	Developing an Intervention to Foster Early Number Sense and Skill
R324A120071	Development of a Game-based Integrated Learning and Assessment System to Target Whole Number Concepts (Project NumberShire)

Reading, Writing, and Language Development

Award Number	Game-Based Technologies by Chapter
EDIES11C0042	Readorium Software for Improved Reading Comprehension of Non-fiction Science Text
EDIES13C0030	Readorium Rising Reader: Smart Nonfiction Comprehension Software For Students In Grades 3-5
EDIES13C0040	World Explorador
R305A080196	Efficacy of Earobics Step I in English Language Learners and Low SES Minority Children

Award Number	Game-Based Technologies by Chapter
R305A120707	Exploration of Automated Writing Strategy Instruction for Adolescent Writings Using The Writing Pal
R305A130124	Exploring the Educational Game Landscape through Focused Studies and Ecological Interventions
R305A130467	Developing an Online Tutor to Accelerate High School Vocabulary Learning
R305H050133	Creating a Usable Environment to Teach Argument Comprehension and Production Skills
R305S050034	Project PREPARE: Teaching Service Words to Deaf Children
R324A070196	CopyCat: Learning Through Signing

Other Academic Content Areas

Award Number	Game-Based Technologies by Chapter
ED06PO0906	Give Me 5 For Children
ED06PO0936	A National PBS Television & Interactive New Technology Program for Children 7-11
EDIES10C0020	OPEN's Virtual National Parks 3D Learning Environment for Science and Social Studies: Low-Cost and Easy to Implement Curriculums
EDIES12C0034	The American War Featuring Valley Sim
EDIES13C0027	Mission US: An Interactive Solution for Middle School History Learning
EDIES13C0042	Go Games Civics: Meeting Common Core Standards With Tablet-Enhanced Multiplayer Role Play Games

Social and Behavioral Outcomes

Award Number	Game-Based Technologies by Chapter
EDIES11C0039	An Interactive Social Tutoring System to Improve and Measure Social Goals for Students Related to Academic and Other School-Related Outcomes
EDIES13C0041	Hall Of Heroes: An Interactive Social Tutoring System To Improve And Measure Social Goals For Students In Preparation For Transition To Middle School
R305A110583	Interactive Social Tutoring System for Social Skills Training with Elementary Students

Pathways Into and Through Postsecondary Education

Award Number	Game-Based Technologies by Chapter
EDIES13C0026	Dynamic E-Learning to Improve Postsecondary Transition Outcomes for Secondary Students with High Functioning Autism
R305A110288	Strategizing for College: A Game-based Approach to Increasing College Access

Educator Professional Development

Award Number	Game-Based Technologies by Chapter
EDIES11C0045	PlatinuMath: An Online Formative Assessment Math Game for Preservice Elementary Teachers

Appendix F: Computer-Based Assessments by Chapter

Projects are listed in alphanumeric order and may not match the order of presentation within the actual chapter.

Cognition

Award Number	Computer-Based Assessments by Chapter
ED06PO0896	Computer-Enhanced Automated Lecture (CEAL)
EDIES11C0044	Computer Adaptive Triarchic Assessment and Instructional Activities for Early Childhood
R324A120033	Development of a Computerized Assessment of Executive Function for Preschool-Aged Children

Math and Science Education

Award Number	Computer-Based Assessments by Chapter
ED06PO0931	Venture Map
ED07CO0039	Early Childhood Assessment and Intervention to Improve Grade School Students' Math and Reading
ED08CO0044	Online Learning System to Advance Teaching of Hyper Molecular Modeling
EDIES09C0015	Math Monster Mystery: A Formative Assessment in Game Format for Grade 4 Mathematics
EDIES09C0056	Refining and Validating the NimblePad
EDIES10C0024	Perceptual and Adaptive Learning Technologies: Developing Products to Improve Algebra Learning
EDIES11C0026	Project NumberShire: A Game-Based Integrated Learning and Assessment System to Target Whole Number Concepts
EDIES11C0041	Math Education for Adult Learners and College Remediation Using Artificial Intelligence
EDIES13C0044	Teachley: Math Facts - Design And Development Of Intervention Software Promoting Single-Digit Operational Fluency
EDIES13C0045	NumberShire II: Development Of A Second Grade Game-Based Integrated Learning System To Target Whole Numbers And Operations In Base Ten And Operations And Operations And Algebraic Thinking
EDIES14C0025	S3: A Game-based 3rd Grade Math Curriculum
R305A070067	Integrated Software for Artificial Intelligence Tutoring and Assessment in Science

Award Number	Computer-Based Assessments by Chapter
R305A070440	Making Longitudinal Web-Based Assessments Give Cognitively Diagnostic Reports to Teachers, Parents, and Students While Employing Mastery Learning
R305A080063	A Randomized Controlled Study of the Effects of Intelligent Online Chemistry Tutors in Urban California School Districts
R305A080225	Multilevel Assessments of Science Standards (MASS)
R305A080464	Closing the Achievement Gap in Middle School Mathematics Utilizing Stanford University's Education Program for Gifted Youth Differentiated Mathematics Program
R305A080514	Virtual Performance Assessments for Measuring Student Achievement in Science
R305A080614	SimScientists: Interactive Simulation-Based Science Learning Environments
R305A080664	Teaching Every Student: Using Intelligent Tutoring and Universal Design to Customize the Mathematics Curriculum
R305A090502	Lens on Science: Development and Validation of a Computer-Administered, Adaptive, IRT-Based Science Assessment for Preschool Children
R305A090528	Applications of Intelligent Tutoring Systems (ITS) to Improve the Skill Levels of Students with Deficiencies in Mathematics
R305A100069	Embedded Assessments Using the ChemCollective Virtual Lab
R305A100234	An Adaptive Testing System for Diagnosing Sources of Mathematics Difficulties
R305A100875	DeepTutor: An Intelligent Tutoring System Based on Deep Language and Discourse Processing and Advanced Tutoring Strategies
R305A110021	Voyage to Galapagos: Development of a Differentiated Assistance Model in an Inquiry Learning Environment
R305A110782	Explanation and Prediction Increasing Gains and Metacognition (EPIGAME)
R305A120125	An Efficacy Study of Online Mathematics Homework Support: An Evaluation of the ASSISTments Formative Assessment and Tutoring Platform
R305A120390	SimScientists Assessment System
R305A120778	The Development of an Intelligent Pedagogical Agent for Physical Science Inquiry Driven by Educational Data Mining
R305A130160	SimScientists Model Progressions
R305A130612	Enfoque en Ciencia: Extending the Cultural and Linguistic Validity of a Computer Adaptive Assessment of Science Readiness for Use with Young Latino Children
R305A140117	Technology-interactive Classroom-embedded Modules for Measuring Challenging Math and Science Skills of ELs
R305A140221	Efficacy of ALEKS for Improving Student Algebra Achievement
R305B070325	mCLASS®: Development and Analysis of an Integrated Screening, Progress Monitoring, and Cognitive Assessment System for K-3 Mathematics

Award Number	Computer-Based Assessments by Chapter
R305H060070	Integrating Conceptual Foundations in Mathematics through the Application of Principles of Perceptual Learning
R305K030140	Using Web-Based Cognitive Assessment Systems for Predicting Student Performance on State Exams
R305K040008	Integrated Software for Artificial Intelligence Tutoring and Assessment in Science
R324A090340	The Math Learning Companion: An Individualized Intervention for Students with Math Learning Disabilities

Reading, Writing, and Language Development

Award Number	Computer-Based Assessments by Chapter
ED07CO0039	Early Childhood Assessment and Intervention to Improve Grade School Students' Math and Reading
ED07CO0043	4KW: A Multimedia System for Ensuring that Grade School Students Know the Meaning of the 4,000 Most Frequently Used English Words
EDIES11C0019	u-learn.net: An Anywhere/Anytime Formative Assessment and Learning Feedback Environment
EDIES11C0032	MyASL Quizmaker
EDIES11C0042	Readorium Software for Improved Reading Comprehension of Non-fiction Science Text
EDIES13C0039	Infowriter: A Student Feedback And Formative Assessment Environment For Writing Information And Explanatory Texts
EDIES14C0018	Access: Language Arts
EDIES14C0026	Commercializing the Effective K-3 Assessment to Instruction (A2i) Intervention to Reduce Cost and to Scale Access to the Benefit of More Students
EDIES14C0042	The Iowa Assessment of Skills and Knowledge for Automatic Word Recognition and Decoding (iASK)
EDIES14C0045	Automated, Personalized Formative Feedback for Student Writing with the LightSide Revision Assistant
R305A070231	Early ICARE: Early Independent Comprehensive Adaptive Reading Evaluation
R305A090394	The Assess-as-You-Go Writing Assistant: A Student Work Environment that Brings Together Formative and Summative Assessment
R305A090608	Assessing Online Reading Comprehension: The ORCA Project
R305A100261	Assessment of Comprehension in Older Struggling Readers

Award Number	Computer-Based Assessments by Chapter
R305A110284	Using Developmental Science to Create a Computerized Preschool Language Assessment
R305A110549	Development of the School Readiness Curriculum Based Measurement System
R305A120086	Computer Based Assessment System for Reading (CBAS-R): Skills Analysis and Progress Monitoring
R305A120811	Burst: Reading Efficacy Study
R305A130223	Comprehensive Research-Based Computer Assessment and Accommodation System for ELL Students
R305A130467	Developing an Online Tutor to Accelerate High School Vocabulary Learning
R305A130705	Development of a Web-Based Writing Partner (Strategic Writing Assisted by intelligent tutoring for 5th grade Youth (SWAY)) to Improve Writing Persuasive Essays for 5th Grade Students
R305A140065	Individual Growth and Development Indicators: Automated Applications for Performance Evaluation of Early Literacy (IGDI-APEL)
R305A140090	Teaching the Vocabulary of Comprehension: A Technology-Enhanced System to Enhance At-Risk Third Graders' Acquisition and Application of Essential Vocabulary
R305A140185	Multiple-choice Online Cloze Comprehension Assessment (MOCCA): Refining and Validating a Measure of Individual Differences in Reading Comprehension Processes During Reading
R305A140203	Measuring Oral Reading Fluency: Computerized Oral Reading Evaluation (CORE)
R305F100005	Assessing Reading for Understanding: A Theory-based, Developmental Approach
R305G040055	Assessing Reading Comprehension with Verbal Protocols and Latent Semantic Analysis
R305G050083	Assessment of Comprehension Skills in Older Struggling Readers
R305G050091	Assessing Readers Struggling to Comprehend Multiple Sources of Information
R305S050010	An Independently Usable Multimedia Software System in Listening Comprehension and Auditory Repetition Priming for Intellectually Disabled Non-Readers
R324A060034	National Accessible Reading Assessment Projects: Research and Development for Students with Visual Impairments
R324A080006	Project LIBERATE (Literacy Instruction Based on Evidence through Research for Adjudicated Teens to Excel)
R324A090038	Formative Assessment and Instrumentation_Procedures for Reading
R324A100176	Assessing ASL Knowledge and its Relationship to Reading English in Deaf Children

Award Number	Computer-Based Assessments by Chapter
R324A120103	Reducing Special Education/Reading Risk for Urban Learners through An Oral Reading Fluency Intervention

Other Academic Content Areas

Award Number	Computer-Based Assessments by Chapter
EDIES13C0027	Mission US: An Interactive Solution for Middle School History Learning

Social and Behavioral Outcomes

Award Number	Computer-Based Assessments by Chapter
EDIES10P0106	My Personal Academic Plan
EDIES11C0033	A Computer-based Social Intervention for Students with High Functioning ASD: Using Technology to Improve Special Education
R324A100246	Transition Success Assessment
R324A110074	Student Self-Management System (SSMS): Reducing Problem Behavior in Upper Elementary Classrooms by Transferring Externally Applied Teacher Controls to Internally Applied Student Controls
R324A130065	Assessing Self-Determination in the Era of Evidence-Based Practices: The Development and Validation of Student and Adult Measures of Self-Determination

Pathways Into and Through Postsecondary Education

Award Number	Computer-Based Assessments by Chapter
EDIES13C0026	Dynamic E-Learning to Improve Postsecondary Transition Outcomes for Secondary Students with High Functioning Autism
R305A110112	Evaluating the Success of Undergraduates in the U-Pace Intervention to Improve Academic Achievement for All Postsecondary Education Students
R305H140028	Dual-Credit Courses and the Road to College: Experimental Evidence from Tennessee

Assistive Technology

Award Number	Computer-Based Assessments by Chapter
ED08CO0056	The Universal Assessment System (UAS)
EDIES11C0032	MyASL Quizmaker

Award Number	Computer-Based Assessments by Chapter
R324A060034	National Accessible Reading Assessment Projects: Research and Development for Students with Visual Impairments
R324A090028	Using the International Classification of Function-Children & Youth to Guide Communication Instruction for Augmentative and Alternative Communication Users
R324A100176	Assessing ASL Knowledge and its Relationship to Reading English in Deaf Children
R324A110088	Development of Computer-based Testing Accommodations for Students with Visual Disabilities

Instructional Supports and Tools for Classroom Management

Award Number	Computer-Based Assessments by Chapter
ED08CO0044	Online Learning System to Advance Teaching of Hyper Molecular Modeling
EDIES13C0038	Project Hi-Fi: Promoting High Fidelity Of Screening And Progress Monitoring Assessments
EDIES14C0048	Socrative Learning Network
EDIES14C0049	Zaption Mobile: Develop and Testing a Mobile App for Video Learning
EDIES14C0050	The eSparkBeat: A Pulse on the Modern Classroom
R305A080231	The Diagnostic Geometry Assessment Project
R305A110306	Eliciting Mathematics Misconceptions (EM2): A Cognitive Diagnostic Assessment System
R305A120125	An Efficacy Study of Online Mathematics Homework Support: An Evaluation of the ASSISTments Formative Assessment and Tutoring Platform
R305A120217	Innovative Computer-Based Formative Assessment via a Development, Delivery, Scoring, and Report-Generative System
R305A130030	Automating the Measurement and Assessment of Classroom Discourse
R305A130517	Making Individualized Literacy Instruction Available to All Teachers: Adapting the Assessment to Instruction (A2i) Software for Multiple Real-World Contexts
R305H040099	Bridging the Gap: Applying Algebra Cognition Research to Develop and Validate Diagnostic Classroom Algebra Testlet
R305W020001	Scaling Up an Assessment-Driven Intervention Using the Internet and Hand-held Computers
R324A090028	Using the International Classification of Function-Children & Youth to Guide Communication Instruction for Augmentative and Alternative Communication Users
R324A100014	Reliability and Validity Evidence for Progress Measures in Reading

Award Number	Computer-Based Assessments by Chapter
R324A110262	Algebra Screening and Progress Monitoring
R324A130161	Decision Rule Research Project: Curriculum-Based Measurement in Reading

Educator Professional Development

Award Number	Computer-Based Assessments by Chapter
ED06PO0933	From Assessment to Action
EDIES11C0045	PlatinuMath: An Online Formative Assessment Math Game for Preservice Elementary Teachers
R305A080295	Development of an Interactive, Multimedia Assessment of Teachers' Knowledge of Early Reading
R305M060057	Using Video Clips of Classroom Instruction as Item Prompts to Measure Teacher Knowledge of Teaching Mathematics: Instrument Development and Validation
R324A090283	Professional Development that is Systemic, Focused on Teacher Growth, Incorporates Coaching, Collaboration, Cohorts, and Increased Knowledge to Create Student Success

Technology for School Improvement

Award Number	Computer-Based Assessments by Chapter
ED06PO0913	Differentiated Placement Quality Control Model
R305E090005	A Proposal to Measure the Impact of Indiana's System of Diagnostic Assessments on Student Achievement Outcomes