

Ready Now
Early Learning Distance
Resources

2020-2021

Educational Technology Resources

Hello Early Childhood Educators,

First, congratulations for helping the youngest learners and their families navigate technology and learning during such a challenging time. We know you are working long hours to ensure that your children and families are getting what they need to succeed. We also know that there are so many online tools and resources available. It can be overwhelming to choose among all of the options or make sense of all of the companies vying for your attention.

The Early Learning Innovation Network is a national group of early childhood researchers, educators and software developers. Together we have created a variety of research-backed solutions that were developed and evaluated with financial support from the Small Business Innovation Research (SBIR) and other programs at the U.S. Department of Education and its Institute of Education Sciences, National Science Foundation, National Institutes of Health and the Administration for Children and Families at the Department of Health and Human Services. Each of the innovative solutions included in this guide were developed iteratively with feedback from early childhood educators, families and children. Through research-backed processes, developers and their collaborators evaluated the usability, feasibility and promise of learning or efficacy of each product.

These 24 early learning tools are READY NOW for teaching and learning: whether you are teaching in person, virtually, or a combination of both. These award-winning solutions are already leveraged nationally, used by hundreds of thousands of early learning practitioners, students and families. This curated collection for children ages 2 to 8 includes individual tools which you can immediately integrate with instruction, as well as more comprehensive systems that include teacher and administrative dashboards.

For more information about how to use each tool in the online learning environment, you can watch these recorded video sessions from our Early Childhood Covid-19 Response conference [here](#).

Thank you for your work. We are proud to support you serving your students and families. We are inspired by your passion for supporting the youngest learners.

With Kind Regards,

All of us at the Early Learning Innovation Network

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Cognitive ToyBox, New York, NY

Early childhood platform for kindergarten readiness

Contact: Tammy Kwan (tammy@cognitivetoybox.com)



Intervention:

Cognitive ToyBox (CTB) is an early childhood platform for kindergarten readiness. The organization offers CTB Assessment ([Video Demo](#)), a hybrid observation and game-based assessment system to make assessment easier and more actionable for early childhood educators. The organization also offers CTB Learning, a suite of research-backed learning games, including *Fuzzy Numbers* ([Video Demo](#)) that serve as an alternative to the “digital candy” that the average 2-4 year old consumes for 2 hours or more per day. CTB’s mission is to help school administrators, teachers, parents and other family members get every child ready to start and succeed in school and life.

Research Base: CTB’s assessment and learning games are based on years of research on children’s cognitive development, as well as the ease of use of the tool with early childhood educators, caregivers and children. Cognitive ToyBox currently supports organizations that reach over 150,000 children from birth to five years of age across the nation. Researchers at WestEd have conducted several studies to evaluate the usability and feasibility of implementation of CTB Assessment in the classroom. In a pilot study with five early childhood educators and 100 children, the researchers demonstrated that:

- all of the educators successfully integrated the prototype with no disruption to their daily practices
- assessments matched educators own qualitative understanding of children’s abilities
- tool eased monitoring of child progress and helped identify areas where children need instructional support.

In a follow-on Phase II grant, WestEd researchers will carry out a small-scale randomized controlled study with 16 pre-Kindergarten classrooms and 400 pre-Kindergarten students to examine the usability and feasibility, fidelity of implementation, and the promise of the dashboard to inform teacher insights and guide instruction, and improve children's school readiness.

Academic research on CTB Learning has also led to conference posters, as well as [published, research](#) published in peer-reviewed journals. For more information on CTB’s research, see <https://www.cognitivetoybox.com/research.html>.

How to Access Cognitive ToyBox’s products: CTB Assessment and CTB Learning are available on iOS, Android, and computers. The program is available as a subscription service to early childhood programs. Individual apps are also available for purchase on the Apple App and Google Play stores.

Government Awards Supporting R&D: Cognitive ToyBox has been supported by 4 federal awards from the National Science Foundation Innovation Corps for Learning program as well as the Small Business Innovation Research Program at the U.S. Department of Education and the National Science Foundation.



CLI Engage: An online platform for early childhood teachers and families, offering free access to tools for supporting data-based decision-making in the classroom and supporting instruction at home

Owned by The University of Texas Health Science Center at Houston (UTHealth)

Contact: cliengage@uth.tmc.edu

Intervention: CLI Engage is a custom-coded online platform that delivers a wide range of early childhood professional development, child progress monitoring, quality improvement, and family engagement tools, originally developed to disseminate the components of The Early Education Model (TEEM). TEEM, delivered in Texas since 2003 and the focus of multiple studies (see details below), includes integrated delivery of digital child progress monitoring, structured professional development, individualized coaching, and classroom materials (including activities/lessons). These components, after being developed and tested, have been expanded over time to continue supporting educators, including enhancing existing resources with additional high-quality video demonstration captured in classrooms and homes to support implementation. CLI Engage features several TEEM-developed tools available at no cost to educators, with new modifications to support virtual/remote delivery:

- [Distance administration](#) protocols for child progress monitoring
- [Activity/lesson classroom collection](#) for teachers to deliver in-class or remotely
- [Activity/lesson collection for families](#), aligned to classroom collection to support skill development at school and home
- [Customized weekly lessons plans](#) to support home-school partnership

The [activity collection](#), originally only for teachers and tested as part of TEEM with the other components, expanded and adapted to include home-based lessons for families in English and Spanish beginning in 2017. These resources, ready to support teachers with remote instruction, are all available at no cost on CLI Engage (some require creation of a free account to login and view). For remote instruction expected during COVID-19, CLI Engage features free training webinars to support teachers in learning how to deliver remote instruction and monitor child progress, with weekly lessons plans coming in early September.

Research Base: An IES-funded RCT ([R305W020002](#)) in 262 classrooms established the combined effectiveness of the TEEM components (e.g., online professional development program with coaching and child progress monitoring), with positive effects on instructional practices (range of Cohen's $d = .52$ to 1.11), and child language and literacy outcomes (range of Cohen's $d = .15$ to $.84$). Additionally, an IES-funded RCT ([R305A140378](#)) that examined delivery of TEEM components supported by face-to-face and remote coaching approaches showed teachers ($N=217$) who received the intervention (regardless of coaching modality) made greater gains in instructional practices (Cohen's $d = 0.50$ to 1.02), and through teacher changes, showed indirect effects on child-level outcomes. Recently developed family engagement components were piloted with 50 teachers, with 95% agreeing the content would impact their family engagement efforts and over 80% indicated they were "very likely" or "extremely likely" to implement focal strategies with families.

How to Access: <https://cliengage.org>

Government Awards Supporting R & D: The TEEM components hosted on CLI Engage were tested through several studies funded by the US Department of Education's Institute for Education Sciences: R305W020002, R305A140386, R305A140378.

BELLA, Houston, TX

A *Bilingual English Language Learner Assessment Of Kindergarten Readiness*

Contact: Dr. Shiva Khalaf (Shiva.khalaf@times.uh.edu)



Intervention: BELLA is a classroom-based bilingual (Spanish/English) computerized, adaptive, and dynamic assessment for monitoring kindergarten readiness in preschoolers ages 3-5. BELLA is adaptive in that its individualized item delivery is based on students' response patterns; it is dynamic in that it provides systematic feedback for incorrect responses. BELLA includes aspects of early literacy, numeracy, science, and social-emotional development along with a set of cognitive skills (analytical, creative, and practical thinking). The test is administered on a handheld touchscreen device in everyday educational settings. Its interactive format, a game-like environment, and storybook artwork and overall feel creates an inviting and fun environment for young learners; additionally, its large list of over 700 items across 13 different educational sub-domains contains a challenge and sparks curiosity for all levels of ability. BELLA's enjoyable activities allow it to be easily used by children and readily integrated into preschool classroom activities. BELLA has multiple testing phases which can be used several times through the year as a formative (to monitor learning progress) and summative (to determine levels of proficiency) assessments of cognitive and early academic skills relevant to kindergarten readiness. BELLA is administered individually and lasts about 20 minutes; it consists of 6 English and 6 Spanish testing phases and each phase consists of 33 items. The remarkable feature of BELLA is that it does not require a switch between language forms; for bilingual children, it tests school readiness in both languages simultaneously.

Research Base: BELLA is the product of a joint partnership between [the GENESIS Lab of the University of Houston](#), [MindTrust Labs](#), and talented child artists. BELLA is aligned with the theoretical frameworks of TEA guidelines (TEKS) as well as with the USA National Education Standards. BELLA has been piloted with 108 preK students (73 in English and 35 in Spanish) drawn from five schools in South Texas to examine the usability and feasibility of the assessment and finalize the items for implementation. Most students were assessed between 1-4 times with different items. Children were observed during their interactions with the tablet device. Examiners rated their experience with the visuals, audio, and answer mechanisms of the items, and provided qualitative, item-specific feedback based on their observations. These data were compiled and analyzed (both qualitatively and quantitatively) for item/subtest revision. Cronbach's alpha for the English and Spanish pilot paths indicated a fair level of internal consistency (0.68 and 0.65 in English and Spanish, respectively). Generalized partial credit Item Response Models (GPCM-IRT) were used to examine the psychometric properties of the items. Parameter estimates of both one and two parameter logistic models (1PL and 2PL) models were examined for all items. The model fit indices indicated that 2PL models fit the data best. Thus, 2PL parameter estimates were used to identify and modify problematic items. Currently, BELLA is undergoing a validation trial through a large-scale school- and home-based data collection.

How to access BELLA: BELLA is a *free* educational app available to individuals and organizations for educational purposes. Please click [here](#) for more information.

Government Awards Supporting R&D: BELLA was developed through a grant titled "Uno, Dos, Tres, Listos! Monitoring Kindergarten Readiness Bilingually" funded by the US Department of Education under the authority of the SCIENCE REFORM ACT OF 2002.



Marsico Institute of Early Learning & Literacy: Denver, CO

Software from [Learning & Teaching with Learning Trajectories](https://www.learningtrajectories.org) [LT]² ([LearningTrajectory.org](https://www.learningtrajectories.org)): Research-validated, free online apps for children birth to age 8 for early math.

Contacts: Marsico Institute for Early Learning & Literacy; Doug Clements, University of Denver Douglas.Clements@du.edu; Julie Sarama, Julie.Sarama@du.edu

Intervention: An ever-increasing number of software applications on the Learning & Teaching with Learning Trajectories [LT]² online tool help **children** develop through the levels of thinking in essential topics in early math. They include online versions of board games for counting, games in outer space for both [subitizing](#) (quickly recognizing numbers) and matching shapes, and concentration games for number and geometry concepts, all teacher and child approved. In another engaging sequence of activities, children solve *Shape Puzzles* by manipulating shapes (computer *objects*) to develop the math *concepts* and use tools, or computer *actions*, to complete mathematic *processes* such as de/composing, disembedding shapes. [LT]² allows caregivers and teachers to create a class, adding children to the class with child-friendly image-based logon, and assign games based on the level they believe their child has reached. Then, the games adjust to the children's developing level of thinking and produce information related to the approximate learning trajectory level of students.

Research Base: Decades of research by Drs. Clements and Sarama produced the research-based learning trajectories and the [LT]² games move children along. Studies show that preschoolers can make significant learning gains with software targeted to specific math topics, such as software developed from a learning trajectories approach (Clements & Sarama, 2003). Initial studies showed high correlations between the use of this software and child gains (Clements & Sarama, 2008; Sarama & Clements, 2009). All involved real teachers who implemented at high levels of quality. See the studies on [ResearchGate](#). The last version, [LT]², has more than 22,000 users. During Covid-19, more than 25 new users signed up every day. Further, experimental studies showed that the software *alone*, in English (Foster et al., 2016) and Spanish (Foster et al., 2018) versions significantly improves young children's learning of math. All involved real teachers who implemented at high levels of quality. See the studies on [ResearchGate](#). The last version, [LT]², has more than 22,000 users. During Covid-19, more than 25 new users signed up every day. See an [example](#) of a Zoom implementation of one of [LT]²'s activities.

How to Access the [LT]² website: The [LT]² website is available to registered users at <https://www.learningtrajectories.org>. Click on Explore Games in the main tab or allow a child to login with their image-based password.

Awards That Supported These Resources: The learning trajectories in [LT]² were created to support the Nation Science Foundation (NSF)-funded *Building Blocks* project and further developed with multiple grants from the Institute of Education Sciences (IES). Funding from the Heising-Simons Foundation and the Bill and Melinda Gates Foundation supported the latest version of the games and other features of the tool, [LT]².



Marsico Institute of Early Learning & Literacy: Denver, CO

[Learning & Teaching with Learning Trajectories](https://www.learningtrajectories.org) [LT]² ([LearningTrajectorye.org](https://www.learningtrajectories.org)): An online resource for educators and caregivers of children birth to age 8 supporting learning and development of early mathematics.

Contacts: Marsico Institute for Early Learning & Literacy; Doug Clements, University of Denver Douglas.Clements@du.edu; Julie Sarama, Julie.Sarama@du.edu.

Intervention: *Learning and Teaching with Learning Trajectories* (LTLT or [LT]²) is a free tool for early childhood educators to learn about how children think and learn about math and how to teach math to young children “their way” (**birth to age 8**). [LT]² allows teachers, caregivers, and parents to see and use learning trajectories for math, as they view short video clips of good teaching as well as children working on math problems in a way that clearly reveals their thinking. [LT]² runs on all technological platforms, includes alignments with standards and assessments, and includes hands-on and built-in software for children. [LT]² enables teachers to help children find the math in—and develop the math from—their everyday activities, including art, stories, puzzles, and games. See this [video](#) for a description and this [video](#) for a tour.

Research Base: Decades of research by Drs. Clements and Sarama produced the first set of research-based learning trajectories. Every learning trajectory has three parts: a mathematical goal, a developmental progression of levels of thinking, and instructional practices. To support an understanding of *goals*, the [LT]² site uses videos to explain the importance of critical early math topics and a focus tool to show alignments to age/grade, standards, and assessment objectives. For the *developmental progressions* of each topic—levels of thinking—[LT]² provides descriptions and video examples. The application of new research has generated more precision in the developmental progressions. For the *teaching practices*—[LT]² offers examples of environments, interactions, and especially *activities* tailored to help children develop *each* level of thinking. Multiple large-scale research studies around the world, involving more than 300 teachers and 3,000 children created practice-based evidence showing that children are more motivated, engaged, and competent in mathematical thinking when teachers take a learning trajectory approach (Bojorquia et al., 2018; Clements & Sarama, 2008; Clements et al., 2011; Clements et al., 2013; Sarama et al., 2012; Verschaffel et al., 2019). All involved real teachers who implemented at high levels of quality. See the studies on [ResearchGate](#). The last version, [LT]², has more than 22,000 users. During Covid-19, more than 25 new users signed up every day. See an [example](#) of a Zoom implementation of one of [LT]²'s activities.

How to Access the [LT]² website: The [LT]² website is free and available to everyone at <https://www.learningtrajectories.org>.

Awards That Supported These Resources: The learning trajectories in [LT]² were created to support the Nation Science Foundation (NSF)-funded *Building Blocks* project and further developed with multiple grants from the Institute of Education Sciences (IES). Funding from the Heising-Simons Foundation and the Bill and Melinda Gates Foundation supported the latest version of the tool, [LT]².

PBS Kids: Arlington, VA

[Play & Learn Science App](#): A Mobile app for preschool-aged children and their caregivers that fosters exploration of scientific concepts while developing problem-solving skills.

Contacts: CPB-PBS Ready To Learn Initiative; Pam Johnson, Corporation for Public Broadcasting, pjohnson@cpb.org; David Lowenstein, Public Broadcasting Service, dmlowenstein@pbs.org



Intervention: *Play & Learn Science* is a free PBS KIDS mobile app designed to promote science learning for kids ages 3 to 5, and to provide parents and caregivers with guidance about engaging their child in conversation and supporting their children’s inquiry and exploration during their daily lives. The app introduces basic science concepts and science and engineering practices by way of five distinct sets of in-app and hands-on activities. Each set of activities includes three digital games and a designated parent page that incorporates tips, activities, and a journal.

Research Base: A four-week study conducted by EDC/SRI explored the effect of using the app in a supportive context on children’s understanding of science concepts and use of science and engineering practices; children’s use of science vocabulary; child and parent-child engagement in science and engineering; and parent confidence in supporting their child’s science learning. The researchers selected a subset of games and activities in the app for families to explore in a structured sequence, and texted families to remind them of the sequence. The researchers provided families with a data-enabled tablet to access the app, materials and books that elaborate on target concepts and practices, and a guide that reinforced the suggested activities and tips in the app. Families who participated in the study attended two science events at their child’s school, where researchers and educators modeled the activities, tips, and conversational prompts within the app. The findings suggest that when used in a supportive context, the PBS KIDS *Play & Learn Science* app can benefit both children and their parents/caregivers. Child outcomes include gains in understanding of science content and in use of science and engineering practices; increases in use and understanding of science vocabulary; and increased excitement about STEM. Parent outcomes include increased parent-child engagement in science and engineering-related activities; and increases in confidence for supporting their child’s science learning. The findings suggest that a high-quality digital app can be a catalyst for real-world science exploration, especially when it incorporates tips for parents and caregivers about how to mediate children’s use of science-focused digital games, explicit guidance for related real-world science activities they can do at home with their children, and specific suggestions for interacting with their children in ways that stimulate science exploration, thinking, and conversation. For more information on EDC/SRI’s Ready To Learn research, see <http://cct.edc.org/rtl>.

Industry Awards for Innovation: Winner, [2019 American Library Association inaugural Excellence in Early Learning Digital Media Award](#)

How to Access the PBS KIDS Play & Learn Science app: The *Play & Learn Science* app [is available on smart phones and tablets](#). Content developed through the CPB-PBS Ready To Learn Initiative is freely available and accessible via [PBS Learning Media and PBS KIDS](#).

Government Award That Supported The App: A Ready To Learn grant – authorized by the U.S. Congress and administered through the U.S. Department of Education – was awarded to the Corporation for Public Broadcasting (CPB) and Public Broadcasting Service (PBS) in 2015.

PBS Kids: Arlington, VA

[The Cat in the Hat Knows a Lot About That!](#) *A multi-platform media property based on “The Cat in the Hat’s Learning Library” book series by Random House and Dr. Seuss Enterprises.*

Contacts: CPB-PBS Ready To Learn Initiative; Pam Johnson, Corporation for Public Broadcasting, pjohnson@cpb.org; David Lowenstein, Public Broadcasting Service, dmlowenstein@pbs.org

Intervention: *The Cat in the Hat Knows a Lot About That!* resources in an independent study include 28 digital videos, five digital games, and hands-on activities for preschool age children and their parents/caregivers. The resources were developed to support learning by modeling science and engineering practices and language and exploring physical science and engineering content through narrative stories and interactive experiences. At the beginning of each video, two young characters, Sally and Nick, pose a question or define a problem about the natural and human-designed world they have encountered in their own backyard. The associated digital games are designed to support science and engineering learning by providing opportunities for children to explore and manipulate scientific phenomena and simulations. The real-world activities are each aligned with one of the five games and provide an opportunity for children (ideally with older family members or caretakers) to engage in related science and engineering activities.



Research Base: Researchers at Education Development Center (EDC) and SRI conducted an eight-week randomized control trial study with a diverse sample of 454 low-income families and their 4- to 5-year-old children. The study team provided families in the treatment group with access to *The Cat in the Hat Knows a Lot About That!* videos, games, and hands-on activities through a tablet computer and printed hands-on activities. The videos and games were organized by six content themes: bridges; slides and friction; sorting objects; sounds and soundwaves; building and engineering; five senses and making observations. Researchers encouraged families to use the media for about one hour per week for each of the eight weeks of the study. Families also received a calendar showing a weekly focal theme, and weekly text messages about the content. Families in the control-assigned group received a tablet with a data plan. The study found that providing children with access to *The Cat in the Hat Knows a Lot About That!* resources had meaningful impacts on 4- to 5-year-old children’s physical science knowledge and their ability to engage with science and engineering practices. Researchers found a clear positive impact on children’s understanding of physical science concepts related to the two core ideas of matter and forces: (a) the role of material properties (strength and length) and forces in structural stability and (b) the role of material properties (texture) and forces (friction) on movement down an incline. Positive impact was also found on children’s interest and engagement in science. The results of this study indicate that educational media designed to focus on critical science and engineering concepts and skills can help young children understand those concepts and practices and that children’s experiences manipulating materials in a digital context can transfer to understanding of those practices and concepts in the physical world. For more information on EDC/SRI’s Ready To Learn research, see <http://cct.edc.org/rtl>.

How to Access the *The Cat in the Hat Knows a Lot About That!* game-based resources: *The Cat in the Hat Builds That!* app is available for smartphones and tablets. Content developed through the CPB-PBS Ready To Learn Initiative are freely available and accessible via [PBS LearningMedia](#) and [PBS KIDS](#).

Government Award That Supported These Resources: A Ready To Learn grant – authorized by the U.S. Congress and administered through the U.S. Department of Education – was awarded to the Corporation for Public Broadcasting (CPB) and Public Broadcasting Service (PBS) in 2015.

KinderTEK®, Eugene, OR

iPad app teaching critical math skills and building fluency

Contact: Dr. Mari Strand Cary (mscary@uoregon.edu)



Intervention: KinderTEK’s individualized educational system provides instruction and targeted practice shown to support deep and lasting learning. Systematic, focused lesson content and *Pretest - Guided Practice - Test* lesson structures, combined with KinderTEK’s continuous progress monitoring ensure students demonstrate mastery in each phase of learning before moving on to more independent and challenging tasks. Carefully chosen practice opportunities, “just enough” scaffolding and timely academic feedback is provided in every lesson. KinderTEK is a versatile tool and can be used in class, at home, or a combination of the two: students can use the same account and teachers can customize settings and view reports no matter where students learn. KinderTEK empowers each student to experience success and gain confidence as they learn, become proficient at, and review KinderTEK’s Common Core-aligned kindergarten content ([KinderTEK curriculum](#)). Students are motivated through engaging content, intermittent rewards, positive feedback, mastering new content and unlocking new activities and activity center time in each session. Robust reports on KinderTEK’s Data Dashboard facilitate data-driven decision making and customizable features enable teachers to adjust the instructional experience to meet the needs of individual students as they progress through the curriculum.

Research Base: KinderTEK was developed with [years of iterative research](#) by teacher educators and faculty with extensive classroom and special education teaching experience. Several small-scale studies in real classrooms provided evaluation for custom components which were integrated into the app and reporting system. A 2018-19 quasi-experimental study of 123 students revealed that relatively brief exposure to KinderTEK produced gains on distal measures of early numeracy and exploratory analyses suggested that earlier and longer use of KinderTEK may have provided a benefit for students most at risk in math. In further investigation through dissemination studies and full scale efficacy trials, KinderTEK was seen by hundreds of teachers and thousands of students across the US and Canada. Analyses of complete efficacy data with over 2000 students and 150 educators over a period of three years are in progress. Meanwhile, parents and teachers have independently turned to KinderTEK for use by their students. With the pandemic, we offered KinderTEK as a stopgap for distance learning and, as we head into the fall, we encourage educators to integrate KinderTEK into their systematic, planned math instruction, particularly for students at-risk in math. More information can be found on the website at <https://kindertek.com/why-ktek/research>

How to Access KinderTEK Products: KinderTEK is available in the App store for use on any iPad. The Basic version is a [standalone app](#), with a Pro version for more implementation flexibility and robust reporting available via [subscription](#).

Government Awards Supporting R&D: The research reported here was supported by the U.S. Department of Education through the Institute of Education Sciences Grants R324A110286 and R305A170044 and the Office of Special Education Programs Grant H327S140019, all to the University of Oregon. The views expressed herein do not necessarily represent the positions or policies of the Department of Education. No official endorsement by the U.S. Department of Education of any product, commodity, service or enterprise mentioned in this publication is intended or should be inferred.

Seeds of STEM, Worcester, MA

Integrated STEM Curriculum for Preschool and Kindergarten

Contact: Mia Dubosarsky (mdubosarsky@wpi.edu), (seedsofstem@gmail.com)



Intervention: *Seeds of STEM* is a year-long STEM curriculum for Preschool and Kindergarten classrooms. The curriculum integrates science concepts with engineering practices and provides authentic math opportunities. Aligned with national and Massachusetts standards for PreK-K, *Seeds of STEM* includes eight interactive units, engaging children in solving problems “just like engineers”. The first part of each unit immerses children in learning science concepts through games, experiments, books, and songs, while the second part includes a problem related to the same science concepts.

Seeds of STEM was designed in collaboration with teachers and uses everyday classroom materials.

The intervention also includes professional development training and a video library showing different activities being taught in real classrooms. The training includes a session on remote teaching of the curriculum.

Research Base: *Seeds of STEM* was developed over 4 years by researchers from Worcester Polytechnic Institute (WPI), the College of the Holy Cross, and teachers from the Worcester Child Development Head Start Program. The development was guided by an advisory board that included engineers, experts in early childhood education, study design, and, STEM equity. *Seeds of STEM* was tested in close to 40 Head Start classrooms. A pilot study involving 16 classrooms and 40 teachers found a significant increase in teachers’ knowledge, reported practice, and self-efficacy after teaching the full curriculum. Children who experienced *Seeds of STEM* were found to have meaningful gains in problem solving behaviors and vocabulary.

Unit	Science Topic	Problem
1	Intro to problem solving	Help Panda get out of a box!
2	Ice and Water (solids and liquids)	Panda dropped a ring into a cup of water that froze! Help Panda get the ring out.
3	Habitats	Panda’s friend is coming to visit! Create a habitat for Sally Squirrel.
4	The Five Senses	Design a toy for Panda’s friend who is blind
5	Forces and Motion	Panda broke his leg! Design a device to help Panda move!
6	Properties of Materials	Design a container to send cookies to a friend who lives across a river!
7	Plant Parts and Needs	Gladys the Goat ate Panda’s plant! Design a barrier to protect the Panda’s plants.
8	Light and Shadow	Panda wants to play outside but it is too hot! Design a shade for Panda.

Awards: *Seeds of STEM* video won the Facilitators Choice in the 2019 STEM for ALL Video Showcase <https://stemforall2019.videohall.com/presentations/1558>.

How to access *Seeds of STEM*: Visit <https://www.seedsofstem.org/> for more information, and email Mia Dubosarsky (mdubosarsky@wpi.edu) with questions. Please note: Attending a *Seeds of STEM* workshop is required in order to get access to the curriculum.

Government Award That Supported *Seeds of STEM*: Institute of Education Sciences, U.S. Department of Education, Grant #R305A150571: <https://ies.ed.gov/funding/grantsearch/details.asp?ID=1720>

MOD System: Juniper Gardens Children's Project, University of Kansas
Making Online Decisions System for Data-based Decision Making

Contact: Dr. Jay Buzhardt (jaybuz@ku.edu)

Intervention: Designed for infant-toddler educators and home visitors, the MOD guides language intervention decision making based on child data ([Video Demo](#)). Like personal support tools (GPS, Pedometer, Fit-Bit™, biometric monitoring apps, etc.), the MOD provides ongoing, tailored guidance based on children's proficiency on the Early Communication Indicator (ECI), a play-based assessment administered and scored by educators. Intervention recommendations come from the Promoting Communication Tools for Advancing Language of Kids (PC TALK). The MOD's decision-making framework is based on five questions: (1) Is there a problem? Children who score below their age-based benchmark on the ECI are identified as at risk for delay. (2) What is causing the problem? Known clinical and family factors linked to poor progress are considered and documented. (3) What PC TALK strategies should be used? The MOD recommends specific PC TALK strategies individualized to the child's performance on the ECI and educators' clinical knowledge of the family. (4) How much are the PC TALK strategies being used? The educator documents within the MOD how they teach parents about the strategies and how much parents report using the strategies. (5) Are the strategies working? Over time, the MOD reports to the HV the child's performance on the ECI before and after services began; and given a lack of improvement, recommends revising services.

Research Base: To date, the MOD has been tested in two separate longitudinal cluster randomized control trials in Early Head Start home visiting contexts. In both studies, home visitors were randomized to use the MOD to guide their decision making or use a self-guided approach (business as usual). Also, both groups used the ECI for progress monitoring and PC TALK strategies for children scoring below benchmark on the ECI. The first study, in a single midwestern state with 124 families and 48 home visitors, found that children served by MOD home visitors had significantly greater growth on the ECI than children served by self-guided home visitors. The second study, in four states with 214 families and 163 home visitors, found that families served by MOD home visitors used more PC TALK strategies. Also, MOD children showed stronger growth on the ECI, as well as the raw and standard scores on the Preschool Language Scale (PLS-5) after six months. Effect sizes nearly doubled for MOD families on 12-month follow-up. For more information about MOD and IGDIs research, see <https://igdi.ku.edu/research/publications/>



How to Access IGDIs and the MOD: The MOD System is available through the online IGDI Platform, accessible through any web browser. The IGDI Mobile App can be downloaded through the Google Play Store, but is not required. Use of the IGDI and MOD system requires training and certification by IGDI trainers at Juniper Gardens Children's Project (<https://igdi.ku.edu/contact-us/>).

Government Awards Supporting R&D: *Office of Special Education Programs:* 2 completed Steppingstones of Technology awards (H327A040004, R324A120344), Current Stepping-Up Technology award (H327S140024); *Institute of Education Science:* Goal 3 Efficacy award (R324A120365), Current Goal 2 Development award (R324A170141)

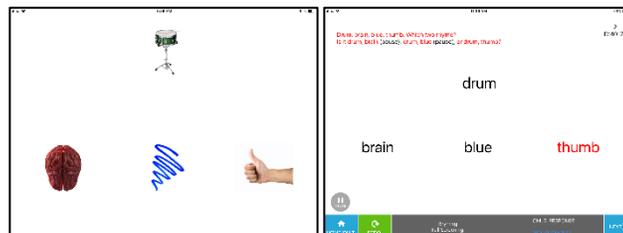


Individual Growth & Development Indicators (IGDIs): University of Minnesota

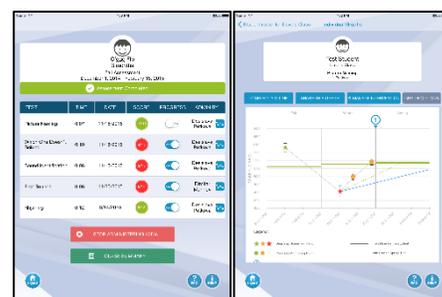
IGDI APEL: *A mobile app to support assessment of preschool language and early literacy skills and classroom data-based decision-making.*

Contacts: Alisha Wackerle-Hollman (wacke020@umn.edu)

Intervention/Assessment: Individual Growth and Development Indicators (IGDIs) are brief, easy to use measures of language and early literacy designed for use with preschool children (ages 3 to 5). Through IES-funded projects, we have expanded IGDIs to English, Spanish, and Hmong. IGDI assessments include Oral Language, Phonological Awareness, Alphabet Knowledge, and Early Comprehension measures. IGDIs are psychometrically robust measures that provide teachers with a mobile application (IGDI APEL) to facilitate the use of a multi-tiered system of support (MTSS) in early childhood. IGDI APEL allows teachers to screen students to identify tier level candidacy, monitor progress during intervention, evaluate screening status and performance over time, and uses real-time data to support instructional data-based decision making.



Research Base: IGDIs are instances of General Outcome Measures (Fuchs & Deno, 1991) and have been developed, refined, and expanded programmatically over the past two decades. In a recent pilot study of IGDI APEL, over 60 teachers were recruited to implement the use of IGDI APEL in their classrooms and we evaluated whether its use led to changes in teacher behavior and student early literacy outcomes. Results indicate promise for the potential of IGDI APEL to promote student growth on measures of language and early literacy. Overall, teachers reported positive experiences with using IGDI APEL; 94% of participants in the intervention group reported that having more information about their students allowed them to intervene to promote skills in language and early literacy. In addition, students in classrooms where a teacher had access to the technology-based version of IGDI APEL demonstrated significantly higher gains than their peers in the control group on IGDI measures of phonological awareness (i.e. First Sounds, an increase of .18 logits per month) and Oral Language (i.e. Picture Naming, an increase of .13 logits per month at $p < .05$). These results suggest that with tools for screening, progress monitoring, and an interface to view those results, teachers can adapt intervention to improve students' language and literacy skills.



How to Access IGDIs and the IGDI APEL app: Schools and districts interested in research partnerships should contact Alisha Wackerle-Hollman (wacke020@umn.edu). Research activities are led and managed in the [IGDI Lab](#) at the University of Minnesota, while the commercial version of IGDI products have been licensed and distributed by [Renaissance Learning](#). Renaissance offers IGDI APEL for free in the app store, and students are enrolled via subscription service at a per student cost. IGDI Lab, in partnership with Renaissance, is creating toolkits to support IGDI users in conducting rigorous assessments and applying principles of MTSS within virtual and hybrid schooling models during the COVID-19 pandemic, which will be available in the fall of 2020.

Government Award That Supported The App: IGDI APEL was developed with IES NCER funding R305A140065 as a Development/Goal 2 project.

The Quick Interactive Language Screener (QUILS™): Newark, DE

A web-based, game-like screener for assessing young children's language skills

Contact: Roberta Golinkoff, roberta@udel.edu



Assessment: The Quick Interactive Language Screener™ (QUILS™) is a fun and fast web-based screener that helps teachers, practitioners, and administrators evaluate whether children ages 3-5 are making language progress appropriate for their age group. Importantly, the QUILS can be given over the internet. The QUILS™ looks at three areas critical to language development and later academic success: vocabulary (what words do children already know?), syntax (what do children understand about how words go together in sentences), and process (how good are children at learning new language items?). This assessment takes just 15-20 minutes to complete and engages children with interactive items and colorful, dynamic illustrations. Children can complete the screener on a touchscreen computer or tablet with little supervision, and no special training is needed for the administrator. The automatically generated reports are detailed, yet simple and easy to understand ([Video Demo](#)). The QUILS™ helps parents and teachers identify children who may need extra support and / or referral to a Speech Language Pathologist or other expert for follow-up assessment.

The Quick Interactive Language Screener: English-Spanish (QUILS:ES™) is a culturally and linguistic sensitive adaptation that assess language skills for bilingual 3-to-5-year-olds. It will be available Fall 2020.

Research Base: The QUILS™ was developed by a team of experts in language development, linguistics, and speech-language pathology (R. Golinkoff, J. de Villiers, K. Hirsh-Pasek, A. Iglesias, and M. Wilson) and is based on the most current research on language acquisition. The items in the QUILS™ were intentionally selected to eliminate cultural, dialect, and gender bias. Testing was performed on a diverse sample of 415 children. Psychometric studies have established the reliability and validity of the QUILS. The overall QUILS™ standard score as well as the area scores correlate highly (in the range of .6) with two commonly used language assessments, PLS-5 and PPVT-4. The overall coefficient for test-retest reliability with 3-5 weeks between tests was found to be .83, showing that QUILS™ can reliably capture children's performance. Internal consistency of items is high, with a coefficient alpha of .93 for the overall QUILS™. Interrater reliability tests showed that the standard scores on the QUILS™ were no different between different testing sites, so any difference between scores can be reliably attributed to individuals. Rasch analyses showed that fit statistics overall and for each area were close to 1. Similar strong statistics characterize the QUILS: ES and the downward extension of the screener to 2-year-olds, the BabyQUILS, likely available in 2021.

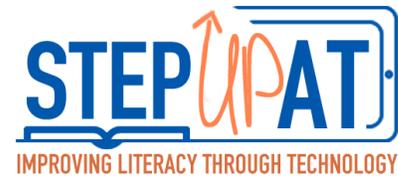
How to access the QUILS™: The QUILS™ is [available for purchase](#) as a subscription service.

Government Awards Supporting R&D: QUILS™ was supported by the U.S. Department of Education through Institute of Education Sciences Grant R305A100215.

STEP UP AT, Miami, Florida & Any Location

Online toolkit to support the use of assistive technology for early literacy activities in the classroom and home.

Contact: Dr. Michelle Schladant (mschladant@med.miami.edu)



Intervention: Step UP AT (www.StepUpAT.com) is an online toolkit designed to help parents and teachers learn to support early literacy, for children 3-5 years old, using assistive technology (AT) resources. Teachers and parents that participate in the program benefit from online learning modules (6 for teachers and 4 for families), virtual coaching sessions, and access to the Step Up AT Device Lending Library (<https://faast.org/stepup/>). All materials are available in Spanish and English. The teacher online modules range in topics from a general overview of AT devices to implementation strategies that address classroom level and individual academic needs ([Video Demo](#)). Teachers receive one on one coaching and immediate feedback following classroom observations, in both the physical and virtual setting. Teacher and coach work together to identify best AT practices that align with the student's IEP goals and create an action plan with detailed steps and resources to achieve the plan's objective. The intervention is facilitated remotely using video conferencing calls and online platforms; coaching has also been provided for virtual learning support. Participating families are provided access to online modules, are encouraged to borrow AT devices, and can schedule sessions with one of our coaches to demonstrate the use of the device and strategies in daily activities at home ([Video Demo](#)).

Research Base: Step Up AT's practices are rooted in the Division for Early Childhood (DEC) recommended practices utilizing the RE-AIM implementation science framework. Our goals for teachers are to increase their knowledge, confidence, beliefs and overall use of AT and inclusive practices in the classroom. Step Up AT has served 74 teachers and 135 families in Miami-Dade and Broward counties over 4 years. During a clustered waitlist randomized control design with 42 teacher and 68 child-family participants, teachers reported an increase in knowledge about AT, more positive beliefs about AT, and higher confidence with using AT following the intervention. Teacher use of AT in the classroom also improved. Children's early literacy abilities improved, specifically in the domain of alphabet knowledge, when compared to students who did not participate in the Step Up AT program.

How to Access Step Up AT: Log onto www.stepupat.com on any smart device. Request access to the online learning modules in either English or Spanish. Contact us to learn of availability for virtual coaching.

Government Awards Supporting R&D: Step Up AT is supported by the US Department of Education Office of Special Education Programs (OSEP)

Waterford Upstart, Taylorsville, UT

Kindergarten readiness and family empowerment program

Contact: Benjamin Heuston, PhD

(benjaminheuston@waterford.org)



Kindergarten Readiness: Waterford Upstart is an evidence-based approach to school readiness and family empowerment. The program helps **four-year-old children** develop the [foundational reading and math skills](#) needed for kindergarten readiness. Using a blend of parent training, coaching, and research-based early learning software, the program personalizes supports for families to help every child start school strong, ready for school success. The learning sequence builds directly from scientifically based reading and math research, providing explicit systematic instruction with immediate feedback, embedded scaffolding, and ongoing assessment. The personalized and adaptive learning model includes individualized starting points, adaptive pathways and pace, and mastery-based progression. Waterford Mentor, an innovative new smartphone app, engages parents with a personalized text approach using data from the child’s Waterford Upstart learning software. Three weekly nudges invite, support, and guide parents to engage with their child’s development in impactful ways. These concepts are reinforced by live coaching from the learning coach, including weekly emails and personalized calls with [parents to support program participation and fidelity](#). Family resources and activities are included.

Research Base: Waterford leverages the [findings of early childhood science and scientifically based reading research to optimize brain development](#), address early learning deficits, and promote learning independence. Waterford Upstart has over [20 studies](#) demonstrating effectiveness, including a third-party randomized-controlled trial (RCT) showing significant and sizable positive effects: 0.42 standard deviations of improvement relative to the control group in literacy and 0.38 in math (Overby & Hobbs, 2016). This study meets the [highest standards of rigorous scientific research](#), including Every Student Succeeds Act (ESSA) Tier 1 Strong Evidence (U.S. Department of Education, 2016). Over 91% of children who use Waterford Upstart in the year before kindergarten are ready for kindergarten—compared to a 65% average nationwide and 48% for low-income students (Harris, not dated; Isaacs, 2012). [A longitudinal study shows](#) Waterford Upstart graduates continue to outperform their peers on state standardized tests in reading, math, and science all the way through fourth grade (Suddreth, Throndsen, & Wiebke, 2016). Study results also show significant increases in literacy and math skills for preschool age children, especially among at-risk populations.

Industry Awards for Innovation: Waterford Upstart was named a [2019 Audacious Project](#). The Audacious Project supports “big, bold ideas for global change” and is TED’s initiative to fund ambitious ideas for social good. Waterford Upstart was a 2020 and 2018 SIIA CODIE Award Finalist for Best PreK / Early Childhood Learning Solution. Waterford was also named as a 2017 NewSchools Ignite Early Learning Challenge Winner.

How to Access Waterford Upstart: Waterford Upstart is compatible Windows®, Apple iPad®, Apple Mac®, Android®, and Chromebook®. Waterford Upstart is available to schools, districts, and parents. Pricing options are tailored to the implementation model.

Government Awards Supporting R&D: Waterford was awarded a 2018 U.S. Department of Education Innovation and Research Expansion Grant Award and a U.S. Department of Education Investing in Innovation (i3) in 2013. The RCT study mentioned above was the result of the i3 grant. This study demonstrates strong evidence of impact in literacy for four-year-old children living in rural areas.

Molly of Denali

A PBS KIDS multi-platform series about Molly Mabray and her friends and family living in a small village in Alaska, produced by WGBH Boston.

Contacts: CPB-PBS Ready To Learn Initiative; Pam Johnson, Corporation for Public Broadcasting, pjohnson@cpb.org; David Lowenstein, Public Broadcasting Service, dmlowenstein@pbs.org



Intervention: The first nationally distributed children’s series to feature an indigenous lead character, *Molly of Denali* ([Video trailer](#)) centers on Molly Mabray, a feisty and resourceful 10-year-old Alaska Native girl, and her adventures in the fictional village of Qyah, Alaska. *Molly of Denali’s* multi-media resources are designed to foster literacy skills and support the use of informational text (IT) among 4-to-8-year-old children. An independent randomized controlled trial (RCT) conducted by Education Development Center (EDC) and SRI is underway to assess the impact of a curated subset of these resources on children’s understanding of IT. Child-facing resources include animated stories and live-action interstitials, digital games, and hands-on activities; the intervention also includes parent videos that provided information about different aspects of IT and highlighted how parents can support children’s learning of these skills. The 127 families in the nine-week efficacy study were provided with access to these resources via a data-enabled tablet with the PBS KIDS *Molly of Denali* app and a researcher-developed video app pre-installed. The intervention includes a curated set of 39 videos and 3 games, focusing on a new IT learning goal each week. Access to the videos is staggered over the course of the intervention as a means of sustaining child engagement, with bundles of new video content released every Friday. Each bundle of video content focuses on a different IT feature or skill, with two bundles at the end reviewing previous features and skills. Once released, videos are available on demand; games, activities, and parent videos are available on demand throughout the intervention. Control families were provided data-enabled tablets on which PBS KIDS and other IT apps are blocked. Participants receive 1-2 text messages per week reminding them to complete media logs (both treatment and control groups) and to use the *Molly of Denali* resources (treatment group only). Children’s knowledge of and ability to use IT will be measured pre- and post-intervention using a researcher-designed measure. Because the study period began before widespread closures of schools and suspension of travel, the study’s pre-testing took place in person, but the IT assessment was converted to a digital format and children will be assessed via video conference for post-testing.

Research Base: In addition to the initial RCT, researchers are currently conducting a replication study, which mirrors nearly all aspects of the first study though pre- and post-test are taking place remotely due to COVID-19 restrictions. A report detailing findings from both studies will be available January 2021. For more information on EDC/SRI’s Ready To Learn research, see <http://cct.edc.org/rtl>.

Industry Awards for Innovation: The critically acclaimed television series *Molly of Denali* has been recognized with a 2020 George Foster Peabody Award for excellence in broadcasting in 2019, a Prix Jeunesse finalist honor, and a Parents’ Choice Gold Award. Additionally, the Molly of Denali app is the winner of the [2020 American Library Association Excellence in Early Learning Digital Media Award](#).

How to Access Molly of Denali: *Molly of Denali* is available on PBS stations, PBSKIDS.org and the free PBS KIDS Video app; games can be downloaded to smartphones and tablets on the free PBS KIDS Games app. Content developed through the CPB-PBS Ready To Learn Initiative are freely available and accessible via [PBS LearningMedia](#) and [PBS KIDS](#).

Government Award That Supported The App: A Ready To Learn grant – authorized by the U.S. Congress and administered through the U.S. Department of Education – was awarded to the Corporation for Public Broadcasting (CPB) and Public Broadcasting Service (PBS) in 2015.

[NumberShire](#) Eugene, OR

An evidence-based math game for students grades K-2. Come visit us in Tally-ho!

Contact: Drs. Hank Fien, Nancy Nelson-Fien, and Lina Shanley at the Center on Teaching and Learning, University of Oregon at ns1its@uoregon.edu

Intervention: NumberShire Level 1 is an educational mathematics video game developed to build students' whole number concepts and skills. Through an immersive, gaming and learning platform, NumberShire provides 48 sessions (~15 minutes of game play per session) set within a Renaissance-style village in the fairytale-inspired medieval kingdom of NumberShire. Each session is aligned with the Common Core State Standards for Mathematics with a focus on first grade topics. In each session, the village elder and other characters explicitly teach students new math skills and provide ample practice opportunities. Students receive timely and engaging feedback about their game play performance and earn visual rewards, such as virtual pets or new costumes for their character after completing each session. Session design is based on the growing research base on effective mathematics instruction for struggling learners, and its differentiated learning pathway offers individualized and intensified instruction to meet students' instructional needs. The Teacher Dashboard allows teachers to monitor student performance and progress in NumberShire, and make data-based decisions about how to adjust and individualize instruction for student learning. From the Teacher Dashboard, teachers can also access the Resource Center which includes instructional resources on best practices in early math instruction, multi-tiered systems of support, implementing NumberShire, and differentiating instruction for students with diverse learning needs. Two versions of NumberShire exist (WebGL and iOS), allowing NumberShire to run on all popular web browsers on PC or Mac platforms and on iPads.



Research Results: A randomized controlled trial conducted in 26 first grade classrooms found that students in the NumberShire group ($n = 125$) performed better than control students ($n = 125$) on a math assessment designed to measure learning in the Common Core State Standards for Mathematics. Results of the 8-week pilot study demonstrate that NumberShire can significantly improve mathematics learning in the domains of Counting and Cardinality, Number and Operations in Base Ten, and Operations and Algebraic Thinking. Similarly, preliminary findings from a [recent efficacy study](#) with over 1,500 students demonstrated positive effects of NumberShire on various measures of math achievement.

How to Access NumberShire: Visit www.numbershire.com for more information

Funding Information: NumberShire was developed with funding from the U.S. Department of Education, Institute of Education Sciences, Small Business Innovation Research Programs (EDIES11C0026, EDIES12C0045, EDIES13C0045), a National Center on Special Education Research Development and Innovation Grant (R324A120071), and Efficacy and Replication Award (R324A160125), and the Office of Special Education Programs Stepping-Up Technology Implementation Portfolio (H327S160019).

codeSpark, Pasadena, CA

Teaches the ABCs of coding to ages 5- 9

Contact: support@codespark.com



Intervention: *codeSpark Academy* uses a text-free, game-based programming environment for children ages 5 to 9 years old to learn coding and computational thinking skills. codeSpark translates complex computer science concepts into a fun and engaging format that children can navigate regardless of their age, language, or reading level. Within codeSpark Academy, the *StoryMode* module allows children to create multi-scene animated stories using code ([Video Demo](#)). Early elementary teachers with or without computer science knowledge can integrate StoryMode into their current ELA, Social Studies, Science and many other lessons. Students use coding skills to set up, move, and create interactions between characters and objects for each scene of their story. Children learn sequencing, loops, algorithms, conditionals, and events, all while creating stories that support their teacher's current lesson plan. Teachers can use StoryMode to supplement ELA with book reports ([Video Demo](#)), history lessons, or personal narratives ([Video Demo](#)). The open-ended setup of StoryMode allows teachers to choose how best to use the tool as they integrate it with their current curriculum. Teachers can review, assign, assess, and share with parents the student projects through an integration with our web-based [teacher dashboard](#). Educator resources also include a 10-lesson curriculum, unplugged activities, and getting started videos.

Research Supporting codeSpark in the Classroom: codeSpark's app is rooted in CSTA standards and years of usability, feasibility, and efficacy research.

- A 2015 study performed by KnowProgress showed that following three 30-minute play sessions of codeSpark Academy, 27 participants (age 5-8) demonstrated an increase in computational thinking skills, confidence in problem solving, and interest in STEM.
- In a 2016 study by Mobile Computing Lab, researchers found that using codeSpark Academy 1 hr/wk for 3 weeks significantly improved 69 participants' (age 6-10) computational thinking skills.
- A 2019 study of StoryMode involving 10 teachers and 94 1st and 2nd grade students found it to be easy to use and engaging for both teachers and students after integrating with three ELA lessons.
- In 2021, RAND will perform a randomized-control study with 50-60 classrooms to test the efficacy of StoryMode in teaching computational thinking concepts to first and second grade students.

Industry Awards for Innovation

- Winner, Reimagine Education 2018 Education App Gold Award (2017)
- Best Apps for Teaching & Learning by the American Association of School Librarians (2016)
- Best Learning App for Tablet by Kidscreen Awards (2016)
- Best App or Product for Younger Children at the KAPi Awards (2016)

How to Access codeSpark's Products: [codeSpark](#) is available on iPads, tablets, Chromebooks, and other computers (web-based). The app is free to schools and districts; home purchase is available on the App store.

Government Awards Supporting R&D: codeSpark has been supported by 2 awards from the US Department of Education SBIR Program and one Education and Research Development grant.

TEACHLEY, New York, NY

Math program to promote deep thinking and learning

Contact: Dr. Kara Carpenter (kara@teachley.com)



Intervention: Teachley supports teaching and deepens learning by building students' conceptual understanding, fluency, and problem solving skills.

Teachley includes a suite of puzzle-based learning games and a teacher dashboard that personalize the teaching and learning of mathematics. The intervention can be used for fully in-class, fully remote, or in hybrid teaching and learning situations for Kindergarten to grade 6 classes. Teachley's game mechanics focus on students' play and thinking, helping students develop more efficient strategies and deeper conceptual understanding. Teachley's apps include: *Addimal Adventure* ([Video Demo](#)), which helps students develop efficient addition strategies and discover the connections between facts, for example, seeing how $5 + 6$ is just one more than $5 + 5$; *Mt. Multiplis* ([Video Demo](#)) focuses on the distributive property, for example, seeing how 7×8 can be expressed as 5 groups of 8 plus 2 more groups of 8; *Fractions Boost* ([Video Demo](#)) helps students develop fraction sense; and the newest game *Market Bay* ([Video Demo](#)) is an immersive 3D world where students do math everywhere they go. The Teachley Connect dashboard ([Video Demo](#)) provides teachers real-time insights to monitor progress and differentiate math instruction for individuals and groups of students.

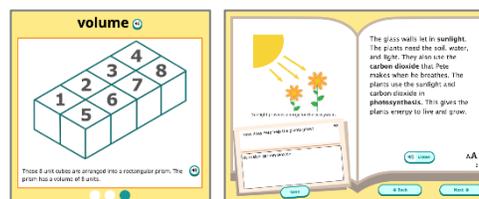
Research Base: Teachley's apps are based on classroom teaching experience and [years of research](#) on children's cognitive development, mathematics pedagogy, and game design/development. Teachley embeds research into every stage of design, from pencil/paper mockups to small-scale learning studies to larger classroom evaluations. Tens of thousands of teachers have successfully implemented Teachley in classrooms (with a 96% reenrollment) and hundreds of thousands of students have played the apps in class and at home. Researchers have conducted several pilot studies to evaluate the usability and feasibility of implementation and the promise of Teachley to improve learning. In a 2014 randomized controlled trial with 80 students in grades 1 to 3, students who were randomly assigned to play Teachley increased in math fluency and strategic math talk outcomes compared those who played other math games. In a 2018 randomized control study with 133 students, students in grades 3 to 5 who played *Teachley's Fractions Boost* significantly improved fractions estimation on a 0-1 number line task compared to students in the control group who played other fractions games, and in the same study a subset of third graders also improved significantly on a set of released NAEP fractions questions. In a 2018 study of Teachley's Connect Dashboard, teachers reported being able to easily use student data from gameplay to monitor students' app usage, to prepare for meetings, and to plan intervention lessons. For more information on Teachley's research, see <https://teachley.com/research>.

Industry Awards for Innovation: Winner, [2014 Apple Design Award](#); 2014 Parent Choice Award; 2016 Balefire Labs Top-Rated; 2017 Children's Technology Review Editor's Choice.

How to Access Teachley's Products: *Teachley* apps are available on iPads, Tablets, Chromebooks, and other computers (web-based). The *Teachley* program is available as a subscription service to schools and districts. Individual apps are available for purchase on the App store.

Government Awards Supporting R&D: Teachley has been supported by 12 awards from the Small Business Innovation Research Program at the US Department of Education, National Science Foundation, and the National Institutes of Health.

SPEAK AGENT, Rockville, MD
Academic Language Learning for K-8 STEM
Contact: Ben Grimley (ben@speakagent.com)



Intervention: Speak Agent engages students in their K-8 math and science curriculum content through digital listening, speaking, reading, writing, and collaboration activities that apply the math and science practices. Using Speak Agent, students accelerate acquisition of STEM concept knowledge and development of STEM communication skills. School districts use Speak Agent as a K-8 supplemental program in both physical and virtual classrooms. It delivers a suite of activities for teacher-led instruction, independent practice, and peer collaboration. Each of the 20 activity types in Speak Agent engages students in one of these modes using a combination of multimodal gameplay, visual aids, interactive stories and/or expressive language. The program is particularly effective for English Learners, low-SES students, and learners who experience an academic language deficit. Speak Agent products include: Elementary Math, Middle-Grades Math, Algebra for English Learners, Elementary Science, and Bilingual Early STEM. Each product includes a teacher dashboard that displays real-time progress, formative assessment data, and items added to the student's digital portfolio. Speak Agent offers year-round professional learning, including 1:1 teacher coaching, a PD knowledge base and video series, and a unique Academic Language Strategies course that showcases research-based instructional strategies.

Research Base: Speak Agent is certified in Research-Based Design. Each of its 20 activity types across every product applies research-based strategies using its academic language learning model. These strategies were applied to product design and development in partnership with Digital Promise's Learner Variability Project, among other research partners. As a result, three pilot studies have demonstrated the promise of Speak Agent to support academic concept acquisition: A QED study (N=74) in 2017-2018 by Rockman et al found that 2nd grade science students using Speak Agent acquired 40 to 52 new TEKS science concepts at a 210% faster rate than students in the control group receiving standard instruction. The effect was repeated in two 12-week phases. In 2018, Montgomery County (N=67) found similar results over a 12-week period in both science and reading. Both populations were 80% English Learner. A small-scale pre/post study by LEANLAB Education in 2019 saw significant gains among 7th graders (N=13) over 9 weeks in reading on KIPP's quarterly assessment.

As of 2020, Speak Agent serves more than 40,000 active students each week and growing. Speak Agent has consistently demonstrated feasibility, usability, and evidence of promise because it is practical to implement in real-world teaching environments. Teachers report being able to learn the basics in a 45-minute training session. Speak Agent products closely align with the classroom curriculum week by week. So, when students are learning about the volume of cylinders and cones or exploring the water cycle, Speak Agent is teaching the relevant, curriculum-aligned academic language to support that.

Industry Awards for Innovation: Winner, 2016 NewSchools Ignite ELL Challenge; Certified Product, Research-Based Design.

How to Access Speak Agent Products: Speak Agent is provided to schools and districts as an annual subscription. It runs on any computer or mobile platform and supports in-classroom use, virtual classroom use, remote independent practice, and hybrid models. Learn more at speakagent.com.

Government Awards Supporting R&D: Speak Agent has received vital R/R&D support from US Department of Education award ED-IES-15C0027 and National Science Foundation award 1632488.

FableVision/Reynolds Center, Boston, MA

FabMaker Studio: Engineering, Design and Fabrication

Contact: Paul Reynolds (paul@fablevision.com)



Intervention: *FabMaker Studio* is a web-based design and fabrication tool that allows students from kindergarten to 8th grade the tools to design, invent, and build their own geometric constructions and working machines using low-cost materials like paper, cardstock or cardboard, and a wide range of tools from scissors to inexpensive 2D cutters, 3D printers, and laser cutters. While maker movement interventions can include more costly and time-consuming 3D printing, the *FabMaker Studio* web-based program has helped pioneer a low-cost alternative using paper and card stock, which is friendlier, more accessible, and highly scalable. Fabricating with paper and card stock is faster and inexpensive, which addresses the issue of time constraints and more equitable access. Because *FabMaker Studio* allows users to evaluate, redesign, and recreate quickly, students are able to experience the full engineering design process, while encouraging creativity, persistence, and resilience. First deployed in 2016, there have been approximately 360,000 users of *FabMaker Studio* from prekindergarten to high school.

Research Base: *FabMaker Studio* emerged from the national *Make to Learn* research initiative – a collaborative of non-profit, educational, and for-profit organizations spearheaded by the University of Virginia with the goal to improve STEM education and the career pipeline. *FabMaker* has been widely deployed in schools and in remote learning environments – feedback from users demonstrates that the intervention is usable across settings and can be feasibly integrated as an intervention. A study of 20 middle school students using an early beta version of *FabMaker Studio* demonstrated a significant increase in student interest in science and technology after eight weeks using the program. In a 2018 survey with 100 students, 96.9% reported positive gains in STEM Interest and 82.1% reported that they feel like have a STEM Identity after using the *FabMaker* platform.

How to Access FabMaker Studio: *FabMaker Studio* is available through FableVision Learning at: <https://www.fablevisionlearning.com/fabmakerstudio>. It is a web-based game that is available on any device connected to the internet.

Government Awards Supporting R&D: Initially support from a [2010 ED/IES SBIR](#) award to [FableVision Studios](#) and the Reynolds Center for Teaching, Learning and Creativity; additional funding support from NSF ITEST, as well as private foundations, including MacArthur, Cisco, Motorola, Alcoa, Dassault US Foundation, and the Morgridge Family Foundation.

STORYWORLD, Oakland, CA

Evidence-based Program for English Language Learners

Contact: Cynthia Barbera (cynthia@storyworld.us)



STORYWORLD is a web-based program for **Kindergarten to Grade 2 children** (and students in older grades) that teaches language and literacy through theme-based, non-fiction and myths/legend narratives written specifically for language learners. STORYWORLD's Lexile® leveled interactive content library consists of over 100 bilingual texts in English with language support in Spanish and Mandarin ([video demo](#)). All stories include interactive “games” that reinforce vocabulary, listening and reading comprehension. Students also record and write answers to prompts relating to the texts, including depth of knowledge, inference and opinion questions. The program is designed to support English Learner's, or dual immersion classrooms, as well as Spanish or Mandarin language programs for all ages. A Formative Evaluation Dashboard ([video demo](#)) allows teachers to track each student's progress vs. class as a whole according to vocabulary and all four modalities (reading, listening, writing, & speaking). The Dashboard helps teachers easily identify students who should be advanced or are at risk of falling behind. STORYWORLD is designed to be used in multiple instructional contexts including independent learning and whole class instruction. Program highlights include:

- Strong focus on vocabulary (including academic vocabulary) with word-by-word scaffolds: Every word of every text is sounded out and then translated in context. Students can click the word to hear it pronounced, click again to hear and read the translation. This enables students to read independently with comprehensible input;
- Stories are translated by educators and read aloud by native speakers;
- Visual clues in illustrations throughout all stories support comprehension;
- Worksheets accompany all stories for extended learning online or offline.

Research Base: STORYWORLD was developed and refined with regular feedback from dual-language and childhood learning experts. Several pilot research studies demonstrate that STORYWORLD functions in-class or remote settings, that students are engaged while using the program, and that teacher use information to understand how students are progressing. A 2018 study revealed that 39 students in Grades 1 and 2 whose home language was Spanish increased in English reading outcomes, and students whose home language was English increased in Spanish reading outcomes. A 2019 pilot study found that 44 students in Grades 1 and 2 who used STORYWORLD for two weeks increased in pre-to-post measures on measures of Self-Concept as a Reader and Value of Reading sub-scales. A consistent finding across all research is that STORYWORLD is highly engaging for students and that the program's gamification engendered friendly competition and cooperation among peers and also motivated students. ([Video Demo describing research on STORYWORLD.](#))

Industry Awards for Innovation: Winner, [NewSchools Ignite ELL Challenge \(2016\)](#); Certified Product, [Research-Based Design \(Digital Promise\)](#).

How to Access STORYWORLD: STORYWORLD is provided as an annual subscription to single classrooms, schools or districts. The program runs on any computer or mobile device and supports in-classroom use, virtual classrooms, independent learning, and hybrid learning models. More at www.storyworld.us.

Government Awards Supporting R&D: ED/IES SBIR awards [2017](#) and [2018](#).

Learning Ovations' Assessment 2 Instruction (A2i)

ESSA strong K-3 literacy program, proven to improve reading outcomes

Contact: Amanda Jacobs (ajacobs@learningovations.com)

Intervention: The Assessment 2 Instruction (A2i)

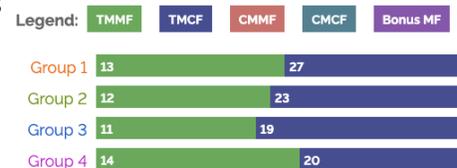
Professional Support System and A2i Distance Learning optimize any K-3 learning program.

Providing access to assessments, instructional recommendations, and customized lessons, the [A2i](#)

[platform](#) helps teachers differentiate both in-person or virtual small group instruction as well as during asynchronous student activities. Anchored in research-proven algorithms, A2i empowers teachers to know how to flexibly group students ([video demo](#)) and utilize curricular resources ([video demo](#)) so that any learning environment is truly differentiated. The short and easy to administer assessments ([video demo](#)) allow teachers to gain insight into each student's strengths and needs. This information is then used to provide guidance on how to spend instructional time and effectively differentiate with the available materials. Lesson activities are provided using existing curriculum materials or open source resources, ensuring the best-fit lesson is provided for all students. A2i provides an answer for "who" and "what" for teachers planning virtual small group instruction, and provides guidance for differentiating independent student learning. As a result, this frees students from a traditional one-size-fits-all model for in-person or distance learning.



DAILY RECOMMENDED GROUP MINUTES



Research Base: Research on Learning Ovations' A2i platform has been ongoing since 2002 and has evolved through work with communities, school leaders, teachers and universities since A2i's original inception. This research has resulted in 7 randomized control trials (RCTs) with diverse populations in ELA, confirming the platform's causal impact on improving student reading outcomes and meeting the [What Works Clearinghouse standards with no reservations](#). In a three-year longitudinal [RCT](#), students who received individualized reading instruction in all three grades showed the strongest reading skills by the end of third grade compared with those who received instruction in control classrooms (students N = 541; teachers N = 117). In addition, 94% of the students who received A2i instruction for three years in a row were reading at, or above, grade-level by the end of 3rd grade. The platform is rated "ESSA Strong," indicating the highest level of validation for supporting student achievement. Implementation of A2i has also demonstrated shifts in teacher practice, 0% of the selected school reported differentiating instruction initially, but after two years of implementation 94% of schools were using small groups, with 60% of teachers reporting they were differentiating instruction during both teacher and child managed time.

How to Access: A2i currently supports over 1,800 users (primarily teachers) in over 100 schools serving 38,000 students. A2i can be accessed on iPads, Tablets, Chromebooks, and other computers (web-based). Accounts can be purchased at the school or district level by contacting Amanda Jacobs (ajacobs@learningovations.com) or reaching out [online](#).

Government Awards Supporting R&D: In 2017, Learning Ovations, Inc. was given the *ONLY* Education Innovation and Research (EIR) Expansion grant awarded in the United States for that year. Research on the A2i platform has been supported by numerous research grants through NIH and IES. In addition, Learning Ovations has received multiple grants through the Small Business Innovation Research Program at the US Department of Education.

[Moby.Read, Analytic Measures Inc. \(AMI\), Palo Alto, CA](#)

An automated oral reading fluency benchmark assessment

Contact: Mike Crepeau, mike.crepeau@analyticmeasures.com

Assessment: *Moby.Read*[®] is a fully automated app for students in **Kindergarten to Grade 5** that presents text passages to young students and scores their oral reading fluency (ORF). The student reads stories aloud, retells them aloud, and answers questions aloud about the content. The app records and scores everything the student says and immediately reports scores for oral reading fluency—reading level, word accuracy, accurate rate (words correct per minute), comprehension, and expression. The app works like a face-to-face oral reading assessment done by teachers. Because Moby.Read assessments are self-administered by students, they save teacher time and should produce more consistent results across classrooms within a school or a district. See [video](#) demo. In the teacher dashboard, Moby.Read shows assessment results at the individual and class levels, and gives each teacher detailed reports on the reading strengths and difficulties of each student. Moby.Read can be implemented in or out of classrooms to support oral reading instruction and encourage improved fluency. Scores and audio recordings can be shared with reading specialists, parents, and students.


 The logo for Moby.Read features the words "MOBY.READ" in a bold, sans-serif font. The word "MOBY" is in a dark blue color, and ".READ" is in a lighter blue color. A red wavy line is positioned underneath the text, resembling a stylized wave or a reading path.

Research Base: Prior to the 2017 ED SBIR award, the developers who founded AMI designed several early tools and technologies for oral reading research and assessment. For the 2002 NAEP ORF study, they built the laptop ORF administration app and the scoring platform. For NCES's 2004 *Fluency Addition to NAAL*, they again built an ORF system, but this time it also automatically scored the responses. In 2014, AMI built a new ORF assessment app for NCES that demonstrated the feasibility of automatically scoring 4th-grade oral readings in classroom settings. Then AMI implemented another ORF assessment (to operate inside the eNAEP system) for NAEP's 2018 ORF special study. Again, AMI developed the ASR and scoring technologies to score the students' read-aloud performances. In 2017-2019, with ED/IES SBIR funding, the team developed a completely re-designed prototype for a stand-alone ORF assessment system. The prototype became the Moby.Read™ product in 2019. The system has new standards-aligned reading passages for ORF benchmarking. It combines robust automatic speech recognition and refined natural language processing technology to automatically score reading level, words correct per minute, comprehension, and expression. Once Moby.Read development was complete, several studies were conducted to test its usability, feasibility, reliability, and validity of Moby.Read. To test usability and classroom feasibility, seven teachers administered the Moby.Read assessment to their students. In addition, 95% of students preferred self-administering the assessment in comparison to being tested by a teacher. AMI researchers also conducted a concurrent study in which 304 grade school students completed grade-level appropriate forms of both Moby.Read (self-administered and automatically scored) and DIBELS (teacher administered and teacher scored). Results showed a high correlation between the scores from the two tests. The same experimental data revealed that across forms the automatic words correct per minute values are highly reliable. These results demonstrated that the technology-delivered assessment produced consistent results that align closely with a gold-standard paper assessment. Results indicate that Moby.Read can be a viable replacement for traditional methods of teacher-administered ORF assessment.

How to Access Moby.Read. Moby.Read is available for purchase [here](#). The site also includes access to a product demo and video overview.

Government Award Support R&D: Moby.Read has been supported by two awards from the Small Business Innovation Research (SBIR) Program at the US Department of Education.

Tutoring with the Lightning Squad, Baltimore, MD and New York, NY
A computer-assisted tutoring system that connects teaching assistants with pairs of students either in school or online to support development of early reading
Contacts: Nancy A. Madden, Ph.D., Success for All Foundation
 (nmadden@SuccessForAll.org) and Christopher Cerf, Sirius Thinking, Ltd.
 (chris@siriusthinking.com)



Intervention: *Tutoring with the Lightning Squad* is a highly motivating, peer-supported, computer-assisted, interactive multimedia tutoring model. Developed by [Sirius Thinking, Ltd.](http://SiriusThinking.com), and the [Success for All Foundation](http://SuccessForAll.org) in collaboration with Sesame Workshop, the program is designed to enable struggling readers in Grades 1-3 to achieve grade-level literacy proficiency by developing skills in fluency, phonics, word blending, spelling, vocabulary and comprehension through a series of game-like cooperative activities. The tutoring software enables a paraprofessional to serve up to four struggling readers at a time for 30 minutes each day, either during school hours or after school. Features include students working cooperatively in pairs on laptops or tablets, alternating roles as “coach” and “player”; exciting new video and game content featuring characters from Sesame Workshop’s popular literacy education television program, [The Electric Company](http://TheElectricCompany.com); sophisticated assessments to analyze students’ progress and errors and prescribe next steps; and “celebrations” as children make progress. In addition, families are given access to an engaging series of online video programs called “Home Links” that reinforce the material presented to students during their tutoring sessions.

Research Base: *Tutoring with the Lightning Squad* was studied in eight elementary schools during a three-month period. Students in grades 1 to 3 who were struggling in reading received daily half hour tutoring sessions in groups of four students. Students worked together as pairs on one computer, and a teaching assistant supported two pairs at a time. Students were assessed, and placed with a partner at their current reading level. The software presented engaging, media-rich and text-based games and activities to build their reading skills, and increased the challenge level as they mastered the content. The tutor provided instruction as needed, as well as encouragement and celebration of progress within the software. Over the three months of the study, students who received tutoring made twice the reading progress, as assessed on standardized reading assessments, as the students in the control group. This randomized control trial was conducted by researchers at Johns Hopkins University. Two additional year-long randomized experiments were conducted using a previous version of the software but the same instructional process. In these studies, the gains for tutored students again significantly favored the tutored group with an average effect size of .43 ($p < .001$). <https://www.tandfonline.com/doi/full/10.1080/10573569.2016.1255577>

How to Access: *Tutoring with the Lightning Squad* supports in-school and virtual tutorial sessions, remote independent practice, and hybrid models, and is provided to schools and districts on an annual subscription basis. Comprehensive initial training, follow-up support, online coaching sessions, and online data reviews are all included in the yearly licensing fee. Learn more at successforall.org.

Government Award That Supported The App: Research and development of *Tutoring with the Lightning Squad* has been supported by a 2014 (Phase I) and [2015 \(Phase II\) Small Business Innovation Research award](http://www.sbir.gov) and by a [2019 Education Technology Research grant](http://www.ed.gov) from the Institute of Education Sciences of the U.S. Department of Education, with additional funding from the Abell Foundation.