Next Generation Learning Challenges Wave II
Final Evaluation Report

Contract #20462, Work Order #18

SRI Project P20778

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Executive Summary

The Next Generation Learning Challenges (NGLC) is a multifaceted, collaborative initiative to leverage technology in ways that transform education and improve student outcomes. With financial support from the Bill & Melinda Gates Foundation and The William and Flora Hewett Foundation, the nonprofit organization EDUCAUSE acted as intermediary for the NGLC initiative, providing grants to 19 organizations for implementing proven and emerging technology-enabled instructional and assessment materials to improve students' mastery of Common Core Standards-aligned content for grades 7 through 9.

The Bill & Melinda Gates Foundation contracted with the nonprofit research institute SRI International for an independent evaluation of the NGLC Wave II grants. The objective of SRI’s evaluation was primarily to provide evidence of the effectiveness of the NGLC Wave II modules, with a secondary focus on building understanding of the ways effects are influenced by context and implementation variables. The Wave II evaluation was designed to address three general research questions:

1. What impact do the Wave II innovations have on students’ mastery of grade 7 to 9 content aligned with the Common Core State Standards (CCSS) as measured by the Northwest Evaluation Association (NWEA) Measures of Academic Progress® (MAP®) or a similar assessment?

2. Do student outcomes vary significantly for different kinds of innovations, schools, students, or treatment doses?

3. To what extent and in what ways were NGLC grant proposals implemented as expected?

SRI’s evaluation used data from the following sources:

- Site visits and interviews with project principal investigators and other team members
- Online survey and implementation/usage spreadsheet completed by principal investigators
- Online teacher survey
- Student achievement data
- Project final reports.

Findings

Project Features and Functions

Many Wave II innovations were designed for implementation in mathematics classes, but relatively few were designed for English classes. Among the 19 Wave II projects, 12 were intended for math classes, 10 for social studies classes, 6 for science classes, and just
4 for English classes. The Common Core State Standards (CCSS) for English language arts include comprehension of readings in subject areas such as social studies and science, as well as such competencies as comparing texts in different genres and analyzing the effects of specific word choices that are typically covered in English classes.

Nearly all the Wave II interventions incorporated embedded formative assessments, and most had some kind of dashboard showing learning data for individual students and entire classes. When asked about the features of their innovations, 89% of principal investigators reported that they had included embedded formative assessments, and 74% said their product included a teacher dashboard.

Many of the Wave II innovations included advanced technology features such as pedagogical agents, simulations, and gaming. Roughly half the Wave II products included each of these features; a third of the products used adaptive, intelligent tutoring. One project incorporated kinesthetic, multimodal experiences with an “embodied interactive whiteboard.”

Student Learning Gains

A meta-analysis on the estimates of learning effects that could be generated for 12 projects found no discernible impact on student learning outcomes for Wave II projects as a whole. Projects’ learning effects were estimated using a range of difference assessments: NWEA’s MAP, state assessments, other standardized assessments, or project-developed assessments. At the project level, three projects appeared to produce learning outcomes that were poorer than outcomes for students receiving instruction without the NGLC innovation, and two projects (iCivics Argumentation Modules and Worcester Polytechnic Institute’s ASSISTments) had significant positive effects.

Teachers nevertheless perceived the Wave II innovations as effective. Asked to compare the gains their students made with the Wave II project solutions with those of the traditional class without the project solution, 70% of teacher survey respondents thought their students learned somewhat or significantly more with the Wave II project solution.

The lack of alignment between the innovative, focused, short-term interventions of Wave II and the full-year content in mathematics and language arts sampled in standardized and state tests limited the prospects for finding positive impacts. Wave II of NGLC sought to identify innovations that could positively affect student achievement on the CCSS on the one hand and demonstrate innovative, technology-supported approaches to teaching and learning on the other. The tension between these two goals was not recognized at the outset of the initiative, with the result that the projects and the main student outcome measure were incompatible. The assessment used for evaluating learning outcomes for most projects (the Massachusetts version of the Northwest Evaluation Association [NWEA] MAP) was judged the best available proxy for a test of CCSS when the evaluation was launched in 2011. Most of the Wave II projects, however, did not address all the CCSS in the relevant subject area. Many focused on particular topics, such as physics, argumentation on civic issues, or laws of motion, which were assessed either by only a very small number of items or not at all on the assessments used to measure learning.
SRI found no existing assessments appropriate for measuring deeper learning goals across the Wave II projects. Although the lack of such measures limited the evaluation’s ability to indicate the impact of the Wave II portfolio on deeper learning, it had little practical consequence for individual projects, which confined their treatment of deeper learning to acquisition of skills in the particular subject areas their innovation covered.

**Implementation**

Nearly all Wave II project leaders reported learning a great deal about school learning environments and the IT infrastructure of schools, consequently building their organizations’ research and development capacity. Of the 19 projects, 17 reported that they learned something that would aid them in designing better learning modules or implementation plans. Some projects realized that high-needs schools required additional implementation support (for example, additional software development to retrofit solutions to work with older versions of computer hardware), while others discovered that they had to negotiate with school administrators to facilitate access to computer labs. Start-up companies’ and other small project teams’ Wave II projects often involved learning how to work in schools, including gaining an appreciation of the constraints on teachers’ decision-making about the use of class time and district policies on research and data collection. Although some projects’ lack of experience working in school settings led to some false starts and overly optimistic initial plans, the Wave II experience helped these organizations build capacity for doing school-based work. Several project leaders expressed a strong desire to continue participating with the NGLC community.

The original timeline for Wave II appears to have been too tight for the level of maturity of some of the innovations. This was evidenced by the fact that 11 of the 19 projects requested (and received) no-cost extensions. The original timeline called for all projects to have completed their classroom solution implementations by June 2012; instead, five projects implemented solutions in classrooms during the 2012–13 school year. Major reasons for delays were difficulty recruiting schools, problems with school technology infrastructures, and the need for more software development.

Nearly all Wave II projects provided the teachers implementing their innovation with appropriate training and support. All but one of the projects provided teacher training, and the median number of training hours was more than 8. Teachers responding to SRI’s survey indicated that the Wave II grantee organizations were their greatest single support for implementing the innovation.

Technology challenges were the biggest impediment to implementing the Wave II innovations. According to teachers, buggy software was the source of most technical difficulties. However, other sources of difficulty such as unreliable Internet connections, firewall constraints, lack of bandwidth, and lack of access to the needed number of computers were cited as well.

A majority of teachers implementing the Wave II innovations reported that the experience improved their teaching practice and enhanced their students’ learning. Teachers participating in Wave II were very positive about the innovations they worked with even while noting software bugs and ways they could have improved their
implementation of the solutions. Large majorities said they would use the innovation again (86%) and that they would recommend it to colleagues (90%).

Although 80% of teachers reported having access to student data from their Wave II learning product, only a minority of teachers reported that the data influenced their instructional approach or the feedback they provided students. The use of student data available on product dashboards was not a major focus of the training provided to Wave II teachers. System student data were accessed once a week or more by 35% of the Wave II teachers. Among these teachers, two-thirds reported using the data in ways that supported the Wave II goals of more frequent and better feedback to students and more personalized instruction.

Implementing technology-based innovations and collecting data on their effectiveness appear to be particularly challenging in high-needs school districts. Often such districts have limited capacity to provide supports such as time for teacher training and joint planning, curricular accommodations, time for administering additional assessments, and release of test records. Constrained by their students’ low test scores and an accountability system based on student performance on state reading and math tests, such districts fear losing instructional time directed toward the content of these tests to new activities or curricular materials or to taking the assessments that are part of an evaluation. Monetary incentives alone are insufficient to overcome these obstacles.

About NGLC Wave II

The NGLC partner organizations (EDUCAUSE, Council of Chief State School Officers, iNACOL, and the League for Innovation in the Community College) designed Wave II to target college-readiness, deeper learning, and secondary education by providing investment capital for implementing proven and emerging technologies and by creating a community of technology innovators and adopters.

All the Wave II projects had an initial 15-month grant term starting in June 2011 with the possibility of a 6-month no-cost extension. NGLC Wave II projects were structured either as whole courses or as 4- to 8-week learning modules, with a clear identification of how such modules might fit into larger learning sequences. In either case, the instructional materials were intended to foster Common Core Standards-aligned competencies in literacy or mathematics.

NGLC Wave II projects were proposed as either Proof of Concept (POC) or Early Stage Adoption (ESA). Among the 19 proposals selected for funding, 9 were categorized as POC and 10 were categorized as ESA. Grants for POC projects were funded at $250,000 to support development as well as adoption for at least 50 students; those for ESA were funded at $500,000 to support expanding adoption for at least 1,000 students.
Recommendations

Designers of technology-supported innovations should start with a clear conception of the role that their product will play in the classroom. Digital technology is flexible enough to support many kinds of learning and address almost any content. But only products that address schools’ learning goals in a time-efficient manner will win widespread adoption. Developers need to identify specific places in the curriculum where their products fit and be able to make the case for the time they want students to spend with their products. Developers need to be clear about whether their product is intended as a core curriculum, a curriculum supplement, or a replacement unit and to design for a usage pattern fitting that role.

Collaborations with researchers and teachers can help technology developers design innovations that enhance learning and are feasible for classroom implementation. Determining whether a technology-supported innovation enhances learning requires development and analysis of student assessments, functions for which few technology developers have training. Similarly, developers often lack insight into likely student behaviors and the many constraints imposed by school settings and practices. Collaborative design and development teams bringing together researchers, practitioners, and technology developers and implementing early piloting and iterative cycles of planning, doing, and data analysis are most likely to produce successful technology-supported innovations (Means, Bakia, & Murphy, in press).

Projects implementing digital learning systems featuring teacher dashboards should train teachers on how to use the data in their practice. Most teachers are not accustomed to using detailed student learning data in their day-to-day practice. Both research demonstrating the impacts on learning of using such data in instructional planning and of providing feedback to students and attention to these practices in teacher training and supports would most likely increase the proportion of teachers taking advantage of this technology affordance.

Future Next Generation Learning initiatives should attend to the issue of matching project learning goals to outcome measures before issuing requests for proposals. When funding a set of projects with similar general goals but a wide range of designs for attaining those goals, the foundation can pursue either of two strategies for obtaining evidence of learning impacts. Either an assessment or set of outcome measures for use across all projects can be identified at the outset and clearly specified in the request for proposals or projects can be allowed to identify their own outcome measures aligned with their specific goals. If the first strategy is chosen, funding decisions should take the proposed innovation’s fit with the specified learning measure into account. If the second strategy is pursued, portfolio-wide analyses will be limited to meta-analytic approaches, but the likelihood that an early-stage innovation will be able to demonstrate learning effects will be increased.

MAP Virtual Comparison Groups (VCGs) should not be relied on as the counterfactual for short-term innovations. According to NWEA, the minimum time between test events where a VCG can be formed is 10 weeks (suggesting receipt of approximately 50 hours of
instruction). Many innovative technology-based learning activities, like those in Wave II, are designed for shorter durations.

*When funding early-stage Next Generation Learning projects, the foundation should consider building in a cycle of refinement after initial implementation, with impact measured for the second implementation.* The Wave II innovations differed greatly in their maturity, and many had software bugs that posed challenges for teachers. In addition, many teachers noted that they would have had a better idea of how to use the software if they had been implementing it a second time. The more innovative a learning product, the heavier the demand for teachers to adopt new practices and new ways of thinking about how students learn. The importance of obtaining feedback from users and of iterating on a product’s design is well known in industry. Delaying the analysis of impact data until the second iteration of an education innovation would reduce the likelihood of underestimating the real potential of a new approach.
1. Introduction

Next Generation Learning Challenges (NGLC) Wave II grants were funded to provide technology-enabled instructional and assessment materials to improve mastery of Common Core Standards-aligned content for grades 7 through 9. The Wave II initiative was based on the premise that new approaches in using state-of-the-art pedagogy and technology and new methods of assessment will enhance student engagement and mastery of critical content and competencies. Key to these improvements are learning activities that provide students with opportunities to engage deeply with challenging academic content and formative assessments that provide both students and teachers with continuous, actionable data that pinpoint areas of success and need.

All 19 of the Wave II projects had an initial 15-month grant term starting in June 2011 with the possibility of a 6-month no-cost extension. NGLC Wave II projects were structured either as 4- to 8-week replacement units or as supplementary learning modules. In either case, the instructional materials were intended to foster Common Core State Standards-aligned competencies in literacy or mathematics.

NGLC Wave II projects were proposed as either Proof of Concept (POC) or Early Stage Adoption (ESA). The Wave II request for proposals (RFP) set expectations for existing user bases and expansion goals for each of the two categories. Grants for POC projects were expected to have an existing user base of 50 students and during the life of the Wave II project to serve an additional 50 students. Those organizations proposing for the ESA category were to have an existing user base of 1,000 students and expand to serve an additional 1,000 students.

The Bill & Melinda Gates Foundation contracted with the nonprofit research institute SRI International for an independent evaluation of the NGLC Wave II grants. The objective of SRI’s evaluation was primarily to provide evidence of the effectiveness of the NGLC-Wave II modules, with a secondary focus on building understanding of the ways effects are influenced by context and implementation variables. The Wave II evaluation was designed to address three general research questions:

1. What impact do the Wave II innovations have on students’ mastery of grade 7 to 9 content aligned with the CCSS as measured by the Northwest Evaluation Association (NWEA) Measures of Academic Progress® (MAP®) or a similar assessment?
2. Do student outcomes vary significantly for different kinds of innovations, schools, students, or treatment doses?
3. To what extent and in what ways were NGLC grant proposals implemented as expected?

1 In its first few months, the evaluation also addressed the question of whether measures existed that grantees could use to measure deeper learning. However, no deeper learning assessment appropriate for use across all the Wave II projects was identified.
This report is structured around these three questions, as follows:

- **Project Descriptions** offers a synopsis of each of the innovations funded under NGLC Wave II. The overall description of the Wave II portfolio summarizes features across projects.

- **Student Learning Gains** turns to the outcomes of the Wave II projects as reported by the projects and as analyzed using NWEA MAP, state assessment data, or other assessment measures.

- **Factors Associated with Differences in Learning Outcomes** describes exploratory analyses testing for associations between various project features and implementation conditions and the innovations’ effect on learning.

- **Implementation Experiences** describes the extent to which NGLC projects were implemented as expected, the supports provided to teachers, and teachers’ perceptions of the NGLC innovations.

- **Summary and Recommendations** concludes the report with our interpretation of the lessons from the NGLC Wave II experience and recommendations for the foundation to consider in future learning technology initiatives.

Exhibit 1 lists the 19 projects in the evaluation, and Exhibit 2 indicates the data sources used.
### Exhibit 1. Grant Project Organizations and Short Names Used in This Report

<table>
<thead>
<tr>
<th>Organization Name (Project Name)</th>
<th>Short Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAST, Inc. (Universal Design for Learning Modules: Supporting Literacy in Physics)</td>
<td>CAST</td>
</tr>
<tr>
<td>Classroom, Inc. (The Sports Network 2 – Reading the Real World)</td>
<td>Classroom Inc.</td>
</tr>
<tr>
<td>EdNovo (Gooru: Learning is Social)</td>
<td>EdNovo</td>
</tr>
<tr>
<td>Education Development Center, Inc. (Wordplay games)</td>
<td>EDC</td>
</tr>
<tr>
<td>Hofstra University (WISEngineering)</td>
<td>Hofstra</td>
</tr>
<tr>
<td>iCivics Inc. (Argumentation Modules)</td>
<td>iCivics</td>
</tr>
<tr>
<td>Imagine Education (Ko’s Journey)</td>
<td>Imagine Ed</td>
</tr>
<tr>
<td>LearnZillion (LearnZillion)</td>
<td>LearnZillion</td>
</tr>
<tr>
<td>Louisiana Department of Education (Algebra for the 21st Century)</td>
<td>LVS</td>
</tr>
<tr>
<td>Massachusetts Institution of Technology (The Labyrinth Challenge: Lure of the Labyrinth)</td>
<td>MIT</td>
</tr>
<tr>
<td>North Carolina State University (Crystal Island Outbreak)</td>
<td>NCSU</td>
</tr>
<tr>
<td>SMALLab Learning LLC (Immersive Embodied Interactive Whiteboards)</td>
<td>SMALLab</td>
</tr>
<tr>
<td>Texas Tech University (Adaptive Problem Solving for Mathematics, APS4Math))</td>
<td>Texas Tech</td>
</tr>
<tr>
<td>University of Massachusetts, Amherst (Intelligent Digital Mathematics Tutoring: Wayang Outpost)</td>
<td>UMass</td>
</tr>
<tr>
<td>University of South Florida, St. Petersburg (SunBay Digital Mathematics)</td>
<td>USFSP</td>
</tr>
<tr>
<td>University of Wisconsin, Madison (CoMPASS-Physics)</td>
<td>UWisc</td>
</tr>
<tr>
<td>WNET (Get the Math)</td>
<td>WNET</td>
</tr>
<tr>
<td>Worcester Polytechnic Institute (ASSISTments)</td>
<td>WPI</td>
</tr>
</tbody>
</table>
**Exhibit 2. Data Sources for This Report**

This report relies on the following sources of data:

**Grantee-reported progress, implementation, and usage reports.** Grantee reports in the form of an online implementation survey (principal investigator survey) and a user statistics template describing site participation and usage provided data on project implementation. For those grant projects (14) that implemented their innovation with students during the 2011–12 school year, the reports were submitted in May 2012. For those projects (5) implementing during 2012–13, the reports were submitted in May/June 2013. SRI analysts discussed any ambiguous or inconsistent reporting patterns with the grantees and created a common dataset of grantee-reported enrollment and outcome data through the end of each project’s grant term.

**Grantee-reported student impact data.** In conjunction with submitting their final report to EDUCAUSE, grantees were asked to submit evaluation data comparing outcomes for students participating in their Wave II innovation with those for similar students in a comparison or control group. SRI analysts reviewed these submissions, requested clarifications or additional data where necessary, and determined whether or not the grantee’s data would support estimation of an effect size for their innovation. In cases where grantees provided data disaggregated by grade level, separate effect sizes were computed for each.

**Northwest Evaluation Association’s Measures of Academic Progress (NWEA MAP) administration.** Six grantees took advantage of the option of administering MAP to generate student achievement results. SRI analysts worked with NWEA to train teachers and administer the assessment, report the data, and generate a virtual control group or adjusted norms analysis.

**Teacher survey.** Teachers involved with Wave II projects implementing during 2011–12 were surveyed in April/May 2012. Teachers involved with Wave II projects implementing during 2012–13 were surveyed in spring 2013. The sample comprised 306 educators, and 235 responded. Of these, 17 had not yet implemented the Wave II solution with students or said that they were not involved at all. These educators were removed from the sample, producing a final sample size for these 19 projects of 218 educators who had used a Wave II solution with students by June 2013. The overall teacher survey response rate was 77%. The teacher survey addressed the educators’ experience with the innovation, training and supports received, and perceptions of student engagement and learning.

**Site visits.** A member of the SRI evaluation team visited each project in the fall 2011. Researchers discussed the project’s logic model, student learning goals, and evaluation plans with each project team. This information was used to inform the ongoing SRI efforts to provide grantees with evaluation support.

**Grantee interviews.** Interim evaluation reports found considerable variability in evaluation plans proposed by the different Wave II projects. The foundation asked SRI to collect more detailed information about projects’ evaluation plans and to provide additional support as needed. SRI conducted interviews with the principal investigator and the evaluator (some teams were too small to have a dedicated evaluator) to profile the plan, clarify data collection, and determine alternative plans as necessary.
2. Project Descriptions

In this section, we first present a brief description of each of the Wave II projects and then present selected information from the principal investigator survey to characterize the set of Wave II projects as a whole.

Of the 19 proposals selected for funding, 9 were categorized as Proof of Concept (POC) and 10 were categorized as Early Stage Adoption (ESA). Within each of these project types was considerable variability in terms of scale and content focus.

Grants for POC projects were expected to serve no less than 100 students. In the ESA category, projects were to have an existing user base of 1,000 students and expand to serve an additional 1,000 students. Scale was difficult to characterize for some projects because of the method of deployment and subsequent participation. For example, LearnZillion reached many more students than participated in their pre-/post-test evaluation, but the sign-in process did not require that the student or teacher identify himself or herself so it was difficult to count unique users. Similarly, WPI reached many more students and teachers than participated in the Wave II evaluation. Discrepancies that might be noted in the numbers of students served are due to those reported for evaluation purposes rather than the actual participants.

Projects addressed the skill target areas, literacy and mathematics, by leveraging various interdisciplinary approaches. For example, the Hofstra team used engineering models to address both science content knowledge and mathematics skills, while the NCSU team used microbiology to address science content knowledge and literacy skills. In Exhibit 3, the scale and skill focus area are noted.
Exhibit 3. Scale and Skill Focus Area of the Wave II Projects

<table>
<thead>
<tr>
<th>Grant Type</th>
<th>Organization</th>
<th>Students Proposed</th>
<th>Students Actual</th>
<th>Skill Focus Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proof of Concept</td>
<td>CAST</td>
<td>100</td>
<td>48</td>
<td>Literacy - Science</td>
</tr>
<tr>
<td></td>
<td>Classroom Inc.</td>
<td>175</td>
<td>364</td>
<td>Literacy – Broadcasting Career</td>
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<tr>
<td></td>
<td>DaVinci Minds</td>
<td>1,050</td>
<td>874*</td>
<td>Math – Energy Science</td>
</tr>
<tr>
<td></td>
<td>EdNovo</td>
<td>1,000</td>
<td>47*</td>
<td>Math - Math</td>
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<td></td>
<td>EDC</td>
<td>1,995,000</td>
<td>295</td>
<td>Literacy - Vocabulary</td>
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<td></td>
<td>Hofstra</td>
<td>100</td>
<td>102</td>
<td>Math - Engineering</td>
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<td></td>
<td>LearnZillion</td>
<td>2,000</td>
<td>130,000**</td>
<td>Math - Math</td>
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<td></td>
<td>LVS</td>
<td>500</td>
<td>350*</td>
<td>Math - Statistics</td>
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<td></td>
<td>Texas Tech</td>
<td>250</td>
<td>104</td>
<td>Math – Problem Solving</td>
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<tr>
<td>Early Stage Adoption</td>
<td>iCivics</td>
<td>1,200</td>
<td>1,120</td>
<td>Literacy – Civic Argumentation</td>
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<td>Imagine Ed</td>
<td>12,500</td>
<td>734*</td>
<td>Math – Algebra I</td>
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<td>MIT</td>
<td>75,000</td>
<td>13,410**</td>
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<td>Literacy - Microbiology</td>
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<td>WNET</td>
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<tr>
<td></td>
<td>WPI</td>
<td>10,000</td>
<td>481*</td>
<td>Math - Math</td>
</tr>
</tbody>
</table>

* Evaluation students only. Served more students.

** Best estimate.

Proof of Concept Grantees

CAST
The Supporting Literacy in Physics modules embed into physics content learning supports and scaffolds based on universal design for learning principles. These online modules are enhanced with learning analytics and assessments to help monitor student progress. Content is presented through various multimedia representations, and interactive features are designed to help students highlight the big ideas. There is a section where students can
keep written notes and a graphic organizer for displaying the connections among different concepts.

**Classroom Inc.**
The Sports Network 2 – Reading in the Real World is a virtual sports network where students take on the role of the managing director. They experience the working environment through a series of activities structured as five simulated workdays. Students make decisions after reading emails, reports, and staff briefs. Besides focusing on reading skills, students also have opportunities to practice collaborative problem-solving skills as they discuss the issues with avatar staff. A teacher dashboard enables progress monitoring by showing assessment data on four Common Core reading standards for individual students or the whole class.

**DaVinci Minds**
WhyCareers Energy is a virtual world for eighth-grade students. Through exploration of careers in green energy fields, students are introduced to topics and problems related to math and science. Lesson plans are mapped to math, science, and career education standards. Student tools include links to local career pathways and educational resources.

**EdNovo**
The Gooru project developed a searchable library of open educational resources, with an organizer that creates a customized collection of lessons, practice exercises, and quizzes to support personalized student learning. The resources in the library include video mini-lessons, simulation applets, individual problems and problem sets, exercises, and assessments.

**EDC**
Wordplay games consist of two digital games and related curricular materials that target instructional support for middle grade students and their teachers on vocabulary development. Both games are geared to provide students with experiences that promote understanding of words with multiple meanings, learning how to derive meaning from context, and practice developing overall strategies for sense making.

**Hofstra**
WISEngineering is an online design environment that challenges middle school students to collaborate and create solutions to engineering design projects. Students work with both physical and virtual 3D models to help refine their mathematical understanding. Each design project has a 1- to 2-week online curricular module that guides the project and focuses on a set of math standards.

**LearnZillion**
LearnZillion is a learning platform that delivers video lessons coupled with assessments and progress reporting. Each video lesson addresses math Common Core Standards and was developed by an expert teacher and reviewed by a teacher panel. The video lessons can be grouped to create individualized student playlists to support personalized teaching.
and learning. Teachers can also use the video lessons to review content and learn more about instructional best practices.

**LVS**
Algebra for the 21st Century uses a hybrid model of learning, combining face-to-face instruction with online course content. Students enroll in the class through their local school and attend on a regular schedule. The online learning modules developed for this project specifically target the Descriptive Statistics strand of the Common Core. Students collaborate in groups of three to four to complete real-world activity labs that involve collecting data using calculator-based probes and sensors and analyzing the generated data to determine whether their original hypothesis was confirmed.

**Texas Tech**
Adaptive Problem Solving for Mathematics (APS4Math) is an adaptive Web-based series of tutorials that support students’ mathematics problem solving (modeling) skills. The tutorial modules provide continuous integration of assessment and teaching components. While students solve problems, an intelligent, adaptive tutor monitors their knowledge and skills to provide feedback in the form of scaffolds. Students who need more assistance in improving problem solving skills receive extra help and guidance, whereas those who have reached higher proficiency are provided with less guidance and more practice with problem solving tasks. APS4Math decomposes the problem solving process into smaller, more manageable steps.

**Early Stage Adoption Grantees**

**iCivics**
Drafting Board is an online education program on civics. For this grant project, Argumentation Modules were created to help students develop stronger literacy and critical thinking skills as they explore issues that matter to them. There are two ways to play: Students can either argue a case in front of the Supreme Court or run their own law firm specializing in constitutional law.

**Imagine Education**
Ko's Journey is a math game embedded in a narrative adventure. It provides 3D animations together with direct manipulation of objects to give students an immersive experience where solving the math problem is part of reaching goals within the story. It also has bridging videos that help the student understand how the math problems in the story are related to problems they may encounter on a standard math test.

**MIT**
The Lure of the Labyrinth is a Web-based game for middle-school pre-algebra students. Each game level has puzzles that engage students in mathematical thinking. Students can work in teams to solve the puzzles. By using the Administrator tool set, teachers or mentors can review individual student progress.
**NCSU**
Crystal Island Outbreak is an intelligent game-based learning environment developed for middle grade students. Students interact with Crystal Island to solve a science mystery as they learn about microbiology. Using pedagogical agents in the guise of laboratory colleagues, students interact, explore, and problem-solve as part of a team of scientists.

**SMALLab**
The Embodied Interactive Whiteboard project provided middle school students with kinesthetic multimodal experiences so that they could “embody” several Common Core math and science concepts via gesture within a game environment. Students learned about simple machines (gears and levers) using gesturally congruent motions that were tracked by a Microsoft KINECT sensor. The modules consisted of a five-game series on mechanical advantage, gear ratios, and the three types of levers while focusing on the Work = Force x Distance equation. Several test measures were created and in-game data were tracked as well.

**UMass**
Wayang Outpost is an intelligent tutoring system that presents math problems to students using multimedia and animated adventures. Wayang Outpost provides individualized support through an animated study partner that provides hints and encouragement. Additionally, the intelligent tutor engine accommodates the student’s learning needs by adjusting the level of the problem, providing scaffolded instruction, and monitoring progress.

**USFSP**
By using SunBay Digital Mathematics, students build mathematical meaning, thinking, and skills. Each unit presents math content through interactive technology so that students can explore and problem-solve within guided, structured activities. Besides content, SunBay Digital Mathematics also provides students with practice in the mathematical processes of representation, reasoning, interpreting, and communicating.

**UWisc**
The CoMPASS-Physics project consists of multiple modules that present physics concepts in two areas: Work & Energy and Forces & Motion. Each learning module combines digital and face-to-face learning opportunities and interactions. CoMPASS-Physics includes a hypertext system (library of terms and concepts), design-project challenge, experiment using physical materials, scientist’s journal (student notebook), and instructional pacing to allow for student collaboration and discussion.

**WNET**
Get the Math is a Web-based virtual work environment depicting settings from a variety of industries (music, video games, fashion, restaurant, basketball, and special effects) to situate real-world algebra problems. Using videos and interactive tools, students can solve math problems typically found in the depicted work environment. Teachers can access
various resources including a training video, a guide with lesson plans, and student handouts that are aligned with math Common Core content and practice standards.

**WPI**

ASSISTments is a Web-based intelligent tutoring system. Teachers use it to manage and assign homework and to post resources in math and science. It allows teachers to write individual student ASSISTments (guidance in the form of questions, hints, solutions, Web-based videos, etc.). The system reports individual student feedback while reporting the results of the embedded assessments to the teacher.

A two-page profile of each of these projects is in Appendix A.

**Wave II Project Features**

The NGLC Wave II RFP stipulated that innovations should enable students to achieve mastery in “a set of literacy or math-based Common Core Standards” and also “support mastery in deeper learning competencies.” *Deeper learning* was defined as “competencies that students must develop in order to effectively solve disciplinary complex problems” (NGLC Wave II RFP, February 18, 2011). Three categories were identified for deeper learning competencies:

- **Content knowledge** – master core academic content, be able to acquire, apply, and expand knowledge
- **Cognitive strategies** – think critically and solve complex problems, communicate effectively
- **Learning behaviors** – work collaboratively, learn how to learn.

Beyond content mastery acquisition and application, deeper learning was not assessed directly by the projects. Some projects used a student survey to gauge engagement as a proxy for deeper learning. All projects addressed either content knowledge mastery or cognitive strategies, but relatively few projects explicitly addressed learning-to-learn behaviors as part of their Wave II solution.

Further, the RFP indicated that the Wave II technology-enabled learning environments should feature embedded assessments that would capture data on student progress toward the target Common Core Standards and feed that data back to students, to help them in their learning, and to teachers, to help them understand and address students’ needs.

Although the intent of Wave II was to support acquisition of CCSS competencies in English language arts or mathematics, the RFP made it clear that the innovation did not have to be implemented in English or mathematics classes. As it turned out, other types of classes were targeted more often than English and math by Wave II projects that were
implementing their solutions in 2011–12. Among the 19 Wave II projects, 11 had solutions for use in math classes, 5 for science classes, and just 2 for English classes. Other types of classes where projects planned to have their solutions used were career technical education classes (2) and civics classes (1). (Projects could be implemented in more than one type of class.)

The principal investigator (PI) survey included items concerning 16 design features. Among these were three features strongly related to the RFP guidance on Wave II solution design: embedded formative assessments, embedded summative assessments, and a dashboard providing the teacher with learning data for each student and the whole class. Principal investigator responses to these items provide some insight into the projects’ fidelity to the RFP design guidelines.

Nearly all projects (17 of 19) reported embedding formative assessment into their solution design (Figure 1). Fourteen principal investigators reported that their solution included a dashboard that would give teachers an easy-to-use window on student progress – individually and as a whole class – and 11 reported embedding summative assessments in their solutions. Hence, most of the innovations appeared to be aligned with the Wave II emphasis on formative assessment. (Teachers’ reports on actual use of the student data provided by these solutions are discussed in Section 5.)

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**Figure 1. Proportion of the 19 projects with key assessment features related to the NGLC Wave II RFP**
Another design feature incorporated into most Wave II innovations was learning scaffolds, such as options to ask for hints, definitions, and alternative presentation features (cited by 13 principal investigators). Over half of the projects (10) offered students print or other physical materials in addition to digital materials. Only 3 projects employed student-to-teacher social media features, only 2 reported student-to-student social media features, and none reported incorporating teacher-to-teacher social media. Eight principal investigators reported providing a solution that gave teachers the option of customizing assessments to fit their needs.

Finally, the frequency with which various technologies, such as simulations, were incorporated into the Wave II solutions is shown in Table 1. Each project used a multiplicity of approaches, as can be seen from the data.

<table>
<thead>
<tr>
<th>Technology Feature</th>
<th>No. of Projects</th>
<th>% Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gaming</td>
<td>9</td>
<td>47</td>
</tr>
<tr>
<td>Simulation</td>
<td>9</td>
<td>47</td>
</tr>
<tr>
<td>Pedagogical agents</td>
<td>9</td>
<td>47</td>
</tr>
<tr>
<td>Intelligent tutoring (adaptive)</td>
<td>6</td>
<td>32</td>
</tr>
<tr>
<td>Interactive whiteboard</td>
<td>5</td>
<td>26</td>
</tr>
<tr>
<td>Digital notebook</td>
<td>5</td>
<td>26</td>
</tr>
</tbody>
</table>

* Respondents checked all that applied, so values may exceed 100%.

### 3. Student Learning Gains

NGLC Wave II projects were selected for their potential to enhance students' attainment of the CCSS. To demonstrate impact on some aspect of these standards, each project was asked to provide scores on a standardized assessment for both students receiving the treatment (the Wave II innovation) and comparable students experiencing instruction as usual. SRI staff encouraged projects to consider use of NWEA MAP, an online adaptive assessment for which a virtual comparison group (VCG) could be created from the extensive MAP student database.

Individual projects made the final decision about the kind of learning outcome data they would provide to the SRI evaluation team. Project leaders were sensitive to the burden that additional assessment activities placed on their collaborating schools and became aware of the constraints imposed by district review practices and policies concerning the release of student data.
Assessment Data Projects Provided

In the end, Wave II projects provided a range of types of student learning data. In rank order from highest to lowest in terms of known technical quality (continuous scale, reliability, validity, and measurement error), these were

1. NWEA MAP in one of three subject areas: Mathematics (Grades 6+), English Language Arts (Reading and Language Usage), or Science (Concepts & Processes and General Science). Both Math and Reading assessments were selected because they are mostly aligned with Common Core Standards.
2. Other standardized assessments – Renaissance STAR Enterprise (Math).
3. State assessments – Florida (FCAT), Massachusetts (MCAS), California (CST), Arizona (AIMS), New Mexico (SBA), South Carolina (PASS), New York (NY S), New Jersey (ASK).
4. Individual project-developed assessments.

Table 2 shows the type of assessment data each Wave II project provided.

Twelve grant projects provided sufficient data to estimate an impact on student achievement: Eight projects provided data generated from a version of the NWEA MAP (versions are specified in the table in Appendix B), one provided data from a commercially available test and a state assessment (Hofstra), one provided state assessment data (USFSP), and two provided data from project-developed tests only (iCivics, Imagine Ed). Additionally, many projects provided data from project-developed assessments that were given only to students experiencing the innovation, thus precluding estimation of the difference in learning gains for treatment and comparison students. In total, roughly 95% of Wave II projects provided student learning outcome data, 47% provided student learning outcome data based on a standardized test, and 63% provided data from a test suitable for estimating student achievement impacts.
### Table 2. Assessment Data Projects Provided

<table>
<thead>
<tr>
<th>Project</th>
<th>NWEA MAP</th>
<th>Other Standardized Test</th>
<th>State Assessment</th>
<th>Project-Developed Assessment</th>
<th>Effect Size Computation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAST</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>NP</td>
</tr>
<tr>
<td>Classroom, Inc.</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>MAP Reading VCG</td>
</tr>
<tr>
<td>DaVinci Minds</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>MAP Math VCG, ANG</td>
</tr>
<tr>
<td>EDC</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>NP</td>
</tr>
<tr>
<td>EdNovo</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>MAP Math VCG</td>
</tr>
<tr>
<td>Hofstra</td>
<td>X*</td>
<td></td>
<td>X</td>
<td>X</td>
<td>STAR Math</td>
</tr>
<tr>
<td>iCivics</td>
<td></td>
<td></td>
<td>X*</td>
<td></td>
<td>Project-developed assessment</td>
</tr>
<tr>
<td>Imagine Ed</td>
<td></td>
<td></td>
<td>X*</td>
<td></td>
<td>Project-developed assessment</td>
</tr>
<tr>
<td>LVS</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>MAP Math VCG; state assessments</td>
</tr>
<tr>
<td>MIT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NP</td>
</tr>
<tr>
<td>NCSU</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>MAP Math ANG</td>
</tr>
<tr>
<td>LearnZillion</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>NP</td>
</tr>
<tr>
<td>SMALLab</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>MAP Science VCG</td>
</tr>
<tr>
<td>Texas Tech</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>NP</td>
</tr>
<tr>
<td>UMass</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>NP</td>
</tr>
<tr>
<td>USFSP</td>
<td></td>
<td></td>
<td>X*</td>
<td>X</td>
<td>State assessment (FCAT)</td>
</tr>
<tr>
<td>UWisc</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>MAP Math VCG</td>
</tr>
<tr>
<td>WNET</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>NP</td>
</tr>
<tr>
<td>WPI</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>MAP Math VCG</td>
</tr>
</tbody>
</table>

* Data collected for comparison classes as well as for those using the innovation.

NP = Not possible    VCG = Virtual comparison group    ANG = Adjusted norms growth
Eight projects did not provide any standardized assessment outcomes:

- **EDC** determined early on that no standardized assessments were well aligned with its innovation. It provided project-developed assessment data for treatment students only.

- **iCivics** originally proposed using Florida state assessments (FCAT) but later determined that FCAT was not well aligned with its innovation. It provided data from project-developed assessments for both treatment and comparison students. The assessment was a persuasive writing task derived from the 2008 version of the California STAR Writing Standards for grade 7.

- **MIT** conducted a focused recruitment campaign but could not recruit schools that already administered MAP. In addition, it ended up implementing its innovation in late spring, too late to administer MAP pre- and post-tests. MIT reported on student game participation and usage only.

- **Texas Tech** had its teachers administer MAP as a pretest measure, but the teachers declined to administer the MAP posttest, citing scheduling conflicts in the late spring. Texas Tech did not report any other assessment data.

- **LearnZillion** was unable to recruit a school district using or willing to administer MAP. It explored alternatives with its partner, Achievement Network. LearnZillion’s project-developed assessments were based on released items from the Massachusetts (MCAS) and District of Columbia tests (DC-CAS). These project-developed assessments were administered only to treatment students in a pre-/post-test design, so no comparison group data were available.

- **Imagine Ed** was unable to secure state assessment data and resorted to using a project-developed assessment. The Imagine Ed project evaluation team reported reliability and validity data for the assessment in a separate evaluation report (Cooney & Wale, 2013).

- **UMass** obtained MAP data for the 2011–12 project implementation students only (local teachers shared data with the project team using individual student identifiers). We were unable to secure MAP data for the students in the 2012–13 project implementation; school and teacher names were not provided.

- **WNET** understood that its classrooms took MAP, but institutional review board restrictions prevented the project team from submitting individual teacher and school names. Without that level of identification, NWEA was unable to locate the data in its data banks.

*Meta-Analysis of Learning Effects*

The assessment data available to SRI researchers were sufficient for estimating the effect of the Wave II innovation for 12 projects. The assessment data used in computing these effect estimates are shown for each project in the last column of Table 2.
To estimate the effect of an NGLC innovation, we needed to have student assessment scores on the same learning measure for both the treatment group and an appropriate comparison group of students who did not experience the innovation. Only 4 of the 19 Wave II projects arranged for comparison groups to support evaluating the impact of their innovation. As noted, projects that were able to arrange for MAP administration did not need to arrange their own comparison groups because the NWEA data bank holds student records that can be used to construct a virtual comparison group. If the project’s data collection window did not meet the criteria for VCG construction, NWEA’s adjusted norms growth (ANG) provided a second option.

Figure 2 displays the effect estimates and associated confidence intervals for the 12 projects used in the Wave II meta-analysis. The effect estimate is the average performance in the treatment group minus the average performance in the comparison group divided by the standard deviation. An effect estimate above 0 indicates that the treatment group performed better than the comparison group. An effect estimate that is less than 0 indicates that the treatment group performed worse than the comparison group. The whiskers around each point estimate on Figure 2 are the 95% confidence interval: Although averages from a sample are only estimates of the true underlying value, if we repeated the data collection and analysis 100 times on the same treatment and comparison populations, we would expect the effect estimate to be no higher than the upper limit and no lower than the lower limit 95 times out of 100. (To put it another way, we can have 95% certainty that the true value lies within the upper and lower whiskers around the point estimate.)

*Half the projects in the meta-analysis had student outcomes that were indistinguishable from the outcomes of conventional instruction (that is, not significantly different from 0).* Among the remaining five projects, two exhibited more growth and three exhibited less growth than conventional instruction.
Figure 2. Effect sizes for 12 Wave II projects

Notes: Hofstra’s estimated effect size is an average of three assessments (the STAR, New Jersey’s ASK, and a project-developed assessment. The STAR test was administered before the implementation of the innovation was finished.
For LVS, 21 of 22 sites had begun implementation of the online units before the administration of the MAP pretest.
When the 12 effect estimates were weighted by sample size and averaged, the result was an effect size of -0.03 ($p = 0.58$) for Wave II. That is, on average, there was no effect of these innovations on measured learning outcomes. The project-level data used in the meta-analysis are displayed in Table 3.

### Table 3. Effect Size Estimates, by Project

<table>
<thead>
<tr>
<th>Project</th>
<th>Effect Size</th>
<th>Standard Error</th>
<th>Lower Limit</th>
<th>Upper Limit</th>
<th>Z-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom Inc.</td>
<td>-0.338</td>
<td>0.079</td>
<td>-0.492</td>
<td>-0.184</td>
<td>-4.300***</td>
</tr>
<tr>
<td>DaVinci Minds</td>
<td>-0.063</td>
<td>0.063</td>
<td>-0.186</td>
<td>0.061</td>
<td>-0.997</td>
</tr>
<tr>
<td>EdNovo</td>
<td>-0.277</td>
<td>0.119</td>
<td>-0.509</td>
<td>-0.044</td>
<td>-2.333*</td>
</tr>
<tr>
<td>Hofstra</td>
<td>0.288</td>
<td>0.240</td>
<td>-0.182</td>
<td>0.758</td>
<td>1.202</td>
</tr>
<tr>
<td>iCivics</td>
<td>0.256</td>
<td>0.033</td>
<td>0.191</td>
<td>0.321</td>
<td>7.737***</td>
</tr>
<tr>
<td>Imagine Ed</td>
<td>0.000</td>
<td>0.104</td>
<td>-0.203</td>
<td>0.203</td>
<td>0.000</td>
</tr>
<tr>
<td>LVS</td>
<td>-0.017</td>
<td>0.083</td>
<td>-0.181</td>
<td>0.146</td>
<td>-0.208</td>
</tr>
<tr>
<td>NCSU</td>
<td>-0.141</td>
<td>0.029</td>
<td>-0.198</td>
<td>-0.084</td>
<td>-4.860***</td>
</tr>
<tr>
<td>SMALLab</td>
<td>-0.206</td>
<td>0.119</td>
<td>-0.440</td>
<td>0.028</td>
<td>-1.727</td>
</tr>
<tr>
<td>USFSP</td>
<td>0.054</td>
<td>0.050</td>
<td>-0.044</td>
<td>0.153</td>
<td>1.078</td>
</tr>
<tr>
<td>UWisc</td>
<td>0.054</td>
<td>0.050</td>
<td>-0.024</td>
<td>0.096</td>
<td>1.191</td>
</tr>
<tr>
<td>WPI</td>
<td>0.036</td>
<td>0.031</td>
<td>0.041</td>
<td>0.158</td>
<td>3.333***</td>
</tr>
<tr>
<td>NGLC Wave II</td>
<td>-0.028</td>
<td>0.051</td>
<td>-0.128</td>
<td>0.071</td>
<td>-0.558</td>
</tr>
</tbody>
</table>

*p < .05; ** p < .01; ***p < .001.

Five of the projects had learning outcomes significantly different from those of their comparison groups. For three of these projects (Classroom Inc., EdNovo, and NCSU), performance on the assessment was worse for students experiencing the Wave II innovation. For two of the projects (WPI and iCivics), assessment results were better for the students experiencing the innovation.

### 4. Factors Associated with Differences in Student Outcomes

The second research question in the evaluation was whether the effectiveness of the Wave II innovations varied for different kinds of innovations, schools, students, or treatment doses. If more effect size estimates had been in the meta-analysis, we could have tested the influence of these factors statistically. With just 12 effect estimates, we can examine the average effect for different subgroups of projects but cannot draw any firm conclusions. We explored a variety of moderator analyses: subject area, grade level, instructional time, assessment used (whether state, various NWEA MAP, or project developed), and grant type. None of the analyses produced results that were statistically significant. For the two variables presented here (grant type and assessment type), the differences approached statistical significance. Results for other variables tested as potential moderators are in Appendix B.
Although the average effect size for ESA grants appeared to be more positive than that for POC grants, the two confidence intervals overlapped, indicating that they were not significantly different (Figure 3). Moreover, both confidence intervals included 0, indicating that neither type of grant on average produced outcomes different from instruction as usual.

![Figure 3. Effect estimates by grant type](image)

We also explored the question of whether the type of student assessment used by a project was associated with the likelihood of finding a positive impact. This question is of interest not only because assessments vary in terms of their technical attributes, but also because standardized or state assessments may not be a good match for the content targeted by Wave II innovations. On the other hand, project-developed assessments may be overly aligned with the project content — that is, they may assess content and skills covered by the innovation that are not dealt with in typical instruction. For Wave II projects, this was a general tension simply because current instruction typically does not yet address some portions of the CCSS and so may not focus on the skill areas emphasized by Wave II innovations. Relatively soon, by the 2015–16 academic year, most classroom instruction will be driven by CCSS, so comparisons between treatment and classrooms with business-as-usual instruction will not pose the same tension.

For the two projects providing student learning outcomes on assessments they developed themselves, we examined their assessments to address the question of whether they were overly aligned with the project solution. For iCivics, the assessment was a persuasive writing prompt derived from a previously released item from the October 2008 California
Standard Assessment\textsuperscript{2} for seventh grade. Although the writing prompt focused on only one aspect of the English language arts CCSS and not on writing more generally, in our view it was not overly aligned because students in comparison classrooms would be expected to be able to respond to this kind of standard writing prompt even though they had not experienced the iCivics curriculum.

Similarly, the Imagine Ed project set out to produce an assessment well aligned with the middle school Math CCSS rather than focusing narrowly on the content of the project solution itself. Imagine Ed provided both item validity and reliability profile information for its assessment. We did not consider this assessment to be overly aligned with the project solution.

Figure 4 shows the average effect size for projects using different kinds of assessments. As would be predicted, the average effect size is more positive for project-developed assessments. These learning measures tend to show positive effects when standardized and state tests do not, an issue we discuss in more detail below. The greater width of the confidence interval (i.e., bar length) for some measures can be attributed to the smaller samples for which those measures were used.

\footnotesize{\hspace{1cm}^2 \text{Available on the STAR Program Resources Web page, http://www.cde.ca.gov/ta/tg/sr/resources.asp}}
Alignment Issues

In our view, the single greatest factor in the disappointing learning outcome data from the Wave II projects was the poor alignment between the learning goals of many of the innovations and the content assessed by NWEA MAP and other standardized and state tests.3 To show an effect on an assessment, an intervention must not only target content that is included in the assessment, but also cover all or a majority of the content in a test for that grade level. Appendix B provides a detailed review of the number of questions on the NWEA MAP that would most likely assess the target skills and knowledge provided by an individual project. For most Wave II projects, less than one-fifth of the questions on the NWEA MAP probed content targeted by the projects. As a result, the great majority of assessment items determining MAP scores concerned content not addressed by the Wave II innovations being evaluated.

Conventional instruction is probably better aligned with the full content of the MAP and available state tests than are the more innovative content and activities in Wave II solutions. We conjecture that spending class time on innovative content that was not covered on standardized tests reduced the amount of time spent on the more basic content typically covered by these tests. This could explain the negative effects on test scores observed for several projects. We describe alignment issues for several projects below to illustrate this problem.

3 Refer to Appendix B for the alignment of projects’ content with CCSS and the NWEA MAP assessment.
Classroom Inc.’s The Sports Network 2 targets college and career readiness by providing reading and writing skills practice. The MAP assessment does assess these skills, but of the 42 items in the MAP test about 12 questions (29% of the test) address these skills specifically. In addition, all MAP questions are multiple choice, and none deal with writing informational communications, which is the focus of the Sports Network 2.

EdNovo’s Gooru provides an infrastructure to search for CCSS-aligned content and organize the selected resources to create a customized collection to support students’ learning needs. The resources that can be added to the collection fall into various categories such as videos, websites, questions (problems sets), interactive simulations, handouts, exams, and others. The key feature that makes Gooru attractive to teachers is that they can select the content. A consequence of this is that content cannot be anticipated or predicted. There is no way to determine in advance how much alignment there will be between students’ experience of Gooru resources and a specific standardized test.

NCSU’s Crystal Island targets college and career readiness by providing opportunities for students to engage in reading complex informational text. The Crystal Island game challenges students to solve a microbiology puzzle by reading various artifacts ranging from scientific articles to email communications. The skills students must demonstrate are reading and interpreting informational text, decision-making based on those interpretations, problem solving, and writing responses offering solutions to the problems posed. The MAP does assess some of these skills, but it does not emphasize informational text. We estimated that approximately nine questions (21%) on the MAP would address the skills targeted by Crystal Island.

In a December 2012 memo to the foundation, SRI described its ratings of the alignment between the competencies targeted by Wave II innovations and the content of the MAP and other standardized tests. At that time, we identified just 6 of the 19 Wave II projects as having a reasonable prospect of influencing standardized test scores. (One of the six, WPI, was the only project that showed a significant positive impact on standardized test scores.)

Insufficient Instructional Time

A related issue is the amount of time students spent working on the competencies covered in the assessments. The next section of this report describes project principal investigators’ plans for the amount of time students would use their innovations and teachers’ estimates of the time actually spent. Regardless of the measure used, students spent less than 25 hours with most of the Wave II innovations. This amount of instruction can be compared with the 10 weeks (50 hours of instruction) that NWEA estimates is necessary to obtain measurable growth on the MAP. It is likely that the Wave II interventions provided too little instruction to show an effect on standardized achievement tests.
Limitations in Methods for Generating Comparison Data for MAP Scores

Virtual comparison group formation. At the onset of Wave II, the NWEA MAP assessment was identified as the standardized measure of choice in part because NWEA had developed a new analytical tool, the virtual comparison group. NWEA uses its vast pool of national data to identify students who match the students participating in the treatment group of interest in terms of school-level factors and student-level factors such as prior achievement, grade level, and time of testing. Through this method, any student participating in one of the Wave II projects using the MAP could potentially have a set of matched comparison students whose scores could be used in estimating impact without the project having to recruit teachers and students to form a comparison group. This was seen as a significant benefit of administering the MAP.

The technical details of VCG formation are critical to understanding the estimates of impact that result from using this method. The technical specifications and process descriptions provided by NWEA are outlined here and detailed in Appendix B. A key feature of the VCG method is that NWEA requires at least 10 weeks of instruction between pre and post administrations of the MAP to allow time for growth to occur. Among Wave II projects that used NWEA MAP data, three undertook NWEA MAP pretesting but were not able to schedule a posttest meeting this requirement for a minimum of 10 weeks of instruction. Both the DaVinci Minds4 and the NCSU groups completed pre- and post-testing but had 8 or fewer weeks between test events, precluding formation of a VCG (an ANG analysis was conducted instead). The Texas Tech project participants did not take a posttest, so no estimate of gains was possible for that project solution.

Even when there are 10 weeks between pre- and post-tests, the ability to form a VCG is limited if the two testing periods do not coincide with the period when many students at that grade level are taking the MAP. Because many Wave II projects began implementation midyear rather than in the fall, the number of students available in NWEA’s data banks for VCG formation was limited, leading to smaller comparison group sizes and hence less precise impact estimates.

In all cases, the VCG method can be applied only to comprehensive scores not to subscales because standard errors are greater when a scale is composed of fewer items.

Adjusted growth norms. For situations that do not meet the conditions of the VCG method, NWEA refers MAP users to its Norms Growth tables and suggests an adjusted norms growth (ANG) analysis. We describe the application of this approach in Appendix B. Here, we note several limitations of the approach, which are illustrated by the example in the appendix.

First, the MAP norms are organized by grade and testing week. They do not take any school-level characteristics into account and use only pretest score as a control variable.

4 One school using DaVinci Minds did meet the 10-week period, but it was a small subset of the entire population. For this one school, the effect size estimates were calculated using both VCG and ANG analyses. We noted a small non-statistically significant difference.
Because ANG analyses are based on a norming study, students with pretest scores above or below those in the norming tables must be dropped from the sample. Moreover, in some cases, especially for short time intervals, the expected growth shown in the norming table is within the range of the MAP measurement error; thus, the MAP is incapable of detecting the expected amount of growth. Finally, the ANGs, like the VCG method, can be applied only to composite scores not to subscales because standard errors are greater when a scale is composed of fewer items.

In short, neither adjusted norms growth nor virtual comparison groups are well suited for providing a precise estimate of the counterfactual for a short-term intervention.

5. Project Implementations

In this section, we take up the final research question, whether or not projects were implemented as expected. Our primary data sources for these analyses were information we gained in working with projects and their schools to implement MAP and obtain assessment results from it or other instruments, the information provided by principal investigators about intended implementation models and the survey responses of teachers who used the innovations in their classrooms.

Timeline

The original Wave II grant period was intended to be 15 months beginning in June 2011 with the onset of funding. Projects had the option of implementing their solutions during summer 2011, fall 2011, spring 2012, or summer 2012. At the time of the fall 2011 site visits, nearly half the grantees described delays in their implementation schedules. The delays were generally attributed to continuing product development, pilot-testing taking longer than anticipated, or difficulties in recruiting districts and schools. Three projects were still developing their solution in fall 2011; another three were involved in pilot-testing or in redesign to respond to feedback collected during pilot-testing; and three more were recruiting districts and schools.

Both UMass and LVS, began implementation during the 2011–2012 academic year but asked for and received a no-cost extension to conduct an additional implementation during the 2012–13 academic year. Three other projects also implemented their solutions during the 2012–13 academic year, LearnZillion, EdNovo, and SMALab. In total, 11 projects applied for and received no-cost extensions; 4 of these were POC grants and 7 were ESA grants.

Training Teachers to Use the Innovation

No matter how good the software, educational innovations depend on teachers to make them work. The Wave II principal investigators demonstrated their awareness of the importance of the teacher role. All but one of the projects offered training to the teachers participating in their project. The amount of time spent on formal training varied: Eleven principal investigators reported that the training they provided lasted for
less than 8 hours, three said it consumed 8 to 20 hours, and five said they gave their 
teacher participants 20 hours or more of training. Seven projects conducted formal 
training online. Implemented aspects of best practice in professional development 
include providing an opportunity to practice teaching while using the solution during the 
training session (10 projects) and giving teachers the opportunity to observe someone 
using the solution as part of the training (6 projects).

A large majority of Wave II projects (84%) offered specific guidance on how to use the 
innovation’s technology as part of their training (Figure 5). Another important NGLC 
feature—how to use learner analytics to inform future whole-class instruction—was 
emphasized less often in Wave II teacher training. **Just seven (37%) principal investigators 
described using online learning data to inform future whole-class instruction as a major 
focus of the training they provided.**

![Figure 4](image.png)

**Figure 4. Summary of the training emphases reported by the Wave II principal investigators**

The intended training principal investigators described can be compared with the received 
training as described by teachers responding to SRI’s survey. The great majority of teachers 
responding to the survey (73%) attended some orientation or training activities for their 
Wave II project, but 27% of teachers indicated that no training was offered. Almost all 
these respondents were from the two projects (MIT and LearnZillion) that did not offer 
teacher training to all their users. (MIT offered some online guidance, and LearnZillion 
offered training to teachers in selected schools in the Washington, D.C., area but not in 
other regions.)
More than half the Wave II teachers experiencing training received more than a full day of training (Table 4). This training intensity is better than average for technology-based innovations (Dynarski et al., 2007).

<table>
<thead>
<tr>
<th>Hours of Training Attended</th>
<th>% of 156 Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 or less</td>
<td>15</td>
</tr>
<tr>
<td>3 – 9</td>
<td>29</td>
</tr>
<tr>
<td>10 – 19</td>
<td>26</td>
</tr>
<tr>
<td>20 – 39</td>
<td>24</td>
</tr>
<tr>
<td>40 or more</td>
<td>6</td>
</tr>
</tbody>
</table>

Note: The total number of respondents reflects those who indicated that they attended training (62 indicated that they did not).

Participating teachers gave high marks to the training they received in using the Wave II solutions. Over half those who participated in training reported finding the training either very valuable (28%) or extremely valuable (25%).

Teachers also indicated that they used their own time outside training hours to prepare to use the Wave II solution. Nearly half (42%) reported using 3–9 hours to prepare while almost a third (31%) reported using over 10 hours. Somewhat less than a third (27%) of the teacher respondents said they used 2 or fewer hours to prepare for implementing the solution.

Time Spent Using the Innovation

Because instructional time typically is a major influence on how much is learned, we asked project principal investigator to provide the number of minutes they wanted implementing classes to spend using their innovation each day and the number of minutes outside the regular school day they would like students to spend with the software. This information was combined with data collected separately on the length of the planned implementation period for each project to compute the total intended student use for the project. Their responses indicated that

- Five projects planned for 10 hours or less of instruction with their innovation
- Five projects planned for between 11 and 24 hours
- Eight projects planned for over 24 hours of instruction with their innovation.

To put these instructional time targets in perspective, a typical instructional class period in middle school is about 50 minutes in length, meaning that during a 5-day instructional week there are just over 4 hours of instruction for each class. Over a 6-week period,

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5 One principal investigator did not provide recommended level of usage information.
students receive about 24 hours of instruction in a subject area, and over 8 weeks students receive about 32 hours of instruction.

The intended implementation times can be compared with the actual implementation times reported by teachers participating in the teacher survey (Table 5).
One might expect that POC projects would have less mature innovations that would receive less student use than the more mature ESA projects, but this was not the case. When the average hours of the two categories of grants are compared, Proof of Concept projects averaged 24 hours of usage in contrast to the 19 hours averaged by Early Scale Adoption projects.

The average number of hours that teachers reported students using the Wave II innovations ranged from just 2 hours to 53, with an average of 20.4 hours. In general, the estimated number of hours that students used the various solutions, based on teacher survey responses, corresponded quite well with the intended number of hours reported by principal investigators. Hence, teachers reported adhering to developers’ usage guidelines; the low exposure rate for Wave II solutions was in keeping with grantees’ designs.
Implementation Barriers

Teachers were asked to identify factors that may have either limited or enabled use of the Wave II solutions.

Immature Software

The most common implementation barrier teachers reported was technical challenge, reported by 55% of respondents (Table 6).

Table 6. Primary Challenges to Implementing the Wave II Solution

<table>
<thead>
<tr>
<th>Primary Challenge</th>
<th>% of 218 Respondents*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical problems (e.g., access, reliability, ease of use)</td>
<td>55</td>
</tr>
<tr>
<td>Student resistance</td>
<td>27</td>
</tr>
<tr>
<td>Lack of alignment with the curriculum</td>
<td>17</td>
</tr>
<tr>
<td>Didn’t work well within allotted class time</td>
<td>15</td>
</tr>
<tr>
<td>Lack of alignment with my teaching approach</td>
<td>7</td>
</tr>
<tr>
<td>Didn’t understand how to use the Wave II solution myself</td>
<td>8</td>
</tr>
<tr>
<td>Other (all)</td>
<td>12</td>
</tr>
<tr>
<td>There were no challenges</td>
<td>15</td>
</tr>
</tbody>
</table>

* Respondents checked all that applied and so values may exceed 100%

Given that the Wave II competition contained two grant categories intended to distinguish between more and less mature technology innovations, one would expect technical difficulties to be more common for the Proof of Concept grants than for the Early Stage Adoption grants. That was not the case, however. Of the 120 respondents who reported technical problems, 89 were involved with ESA projects and 31 were involved with POC projects. This unexpected difference shrinks when the distribution of survey respondents for the two grant types is taken into account: 58% of respondents for ESA projects and 48% of respondents for POC projects reported technical difficulties.6

Additional survey items probed for the nature of technical difficulties. Responses to these items suggested that the most common source of technical problems was the Wave II solution software itself, but issues with the classroom or school technology infrastructure (such as insufficient bandwidth or computer problems) were also common (Table 7).

6 In the survey sample, 160 respondents were working with ESA projects and 75 with POC projects.
Table 7. Nature of Technology Challenges

<table>
<thead>
<tr>
<th>Technology Challenge Type</th>
<th>ESA (% of 89 Respondents)</th>
<th>POC (% of 31 Respondents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software glitches or bugs</td>
<td>65</td>
<td>58</td>
</tr>
<tr>
<td>Computers not working properly</td>
<td>57</td>
<td>32</td>
</tr>
<tr>
<td>Internet connection unreliable</td>
<td>39</td>
<td>45</td>
</tr>
<tr>
<td>Insufficient Internet bandwidth</td>
<td>28</td>
<td>26</td>
</tr>
<tr>
<td>Wave II solution software incompatible with school’s firewall or Internet filters</td>
<td>8</td>
<td>42</td>
</tr>
<tr>
<td>Other (all)</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

Note: The total number of respondents reflects those who indicated that there were technical challenges (98 indicated no technical challenges).

Among the 10% of teachers who said they experienced other types of technology difficulties, the descriptions they provided concerned mainly lack of access to computers when needed, as illustrated in these quotations from teachers:

Not enough computers in class and no computer time outside of class.

During the time I was teaching the unit we had mandatory school-wide testing that needed computer access. Therefore, I did not have access to computers for the first unit; however, had access during the 2nd unit.

Another perspective on the seriousness of technical barriers was provided in teachers’ responses to a separate item asking them to characterize the extent to which technical challenges interfered with their implementation of the Wave II solutions. **Two-thirds of respondents indicated that they experienced technical challenges that interfered either somewhat or a great deal with use of the Wave II solution**, confirming that technology issues were widespread in the Wave II implementations (Table 8). On the positive side, because many teachers did not report any technical challenges, these teachers represent only 37% of the entire sample (and those responding a great deal represent just 10% of the entire sample).
### Table 8. Degree to Which Technical Challenges Interfered with the Use of the Wave II Solution

<table>
<thead>
<tr>
<th>Rating</th>
<th>ESA* (%) of 89 Respondents</th>
<th>POC* (%) of 31 Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>A great deal</td>
<td>21</td>
<td>6</td>
</tr>
<tr>
<td>Somewhat</td>
<td>49</td>
<td>48</td>
</tr>
<tr>
<td>Very little</td>
<td>28</td>
<td>45</td>
</tr>
<tr>
<td>Not at all</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

* Respondents checked all that applied, so values may exceed 100%.

**Note:** The total number of respondents reflects those who indicated that there were technical challenges (98 indicated no technical challenges).

---

**Student Resistance**

*Although a distant second, the next most frequently cited challenge was “student resistance.”* Some indication of the nature of students’ resistance to some of the Wave II solutions can be gleaned from teachers' open-ended responses on the survey describing implementation challenges. These responses suggested student frustration with technical glitches, an inappropriate level of difficulty, an unfamiliar routine, or material that did not match student expectations for what they should be studying, as illustrated by the quotations below.

There were a great many “bugs” in the program. The slowness of the game loading was a huge reason many students did not want to complete the game.

The students enjoyed the program at first, and then became frustrated and when they could not do the work, they had a tendency to shut down and not attempt to do it until someone told them exactly what to do.

My students thought the [_____] lesson was too simple and not an authentic example of someone using math.

The survey also provided response options covering other kinds of challenges that can arise if there is not sufficient care in planning a technology implementation (e.g., poor fit with the allotted class time or teacher not understanding how to use the technology), but these were selected by relatively few survey respondents.

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**High-Needs Schools**
Eight projects focused on recruiting schools with high concentrations of students deemed particularly at risk of inadequate college readiness (low socioeconomic status, English language learners, low achievement). These high-needs schools required technology infrastructure support to varying degrees. Among the reported issues were fragile Internet connections, lack of access to computers, and lack of technology support. In one case, aging school technology caused the project to revise its software (Imagine Ed). Another project had to provide on-site technology troubleshooting to administer NWEA MAP (Classroom Inc.). The EdNovo project originally thought to address students directly with its solution but found that low-achieving students need more scaffolding and monitoring by their teachers to transition to independent learners, so it had to modify its solution to address the teacher level as well.

Other conditions in high-needs schools also made it challenging to conduct research. High teacher and staff turnover and high rates of student transition translated into data attrition. Several projects reported higher than expected (12% or less) data attrition because students who attended at pretest were no longer in attendance at posttest. Similarly, with teacher and staff turnover, commitments to participation were lost and could not be recovered.

Projects implementing solutions in high-needs schools were being responsive to the NGLC Wave II RFP emphasis on serving students in these schools but did not necessarily have the resources or organizational capacity to provide all the supports these schools needed.

**Implementation Supports**

Respondents also identified factors that supported their implementation of the Wave II solution (Table 9). *Chief among the reported implementation facilitators was support from the NGLC grantees* themselves, with 67% of teacher survey respondents citing this source of support.

<table>
<thead>
<tr>
<th>Supporting Factors</th>
<th>% of 218 Respondents*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support from the NGLC developers</td>
<td>67</td>
</tr>
<tr>
<td>Communicating with other teachers implementing the</td>
<td></td>
</tr>
<tr>
<td>Wave II solution</td>
<td>42</td>
</tr>
<tr>
<td>Strong technology support within my school</td>
<td>42</td>
</tr>
<tr>
<td>Support from my principal</td>
<td>35</td>
</tr>
<tr>
<td>Other (all)</td>
<td>12</td>
</tr>
<tr>
<td>None of these</td>
<td>9</td>
</tr>
</tbody>
</table>

* Respondents checked all that applied and so values may exceed 100%

The other types of supports that teachers were asked about on the survey (e.g., support from the school principal) were practices that are generally advocated for successful
technology implementations (Means, 2010). Teachers also had the option to check other and describe additional supports. Of those respondents reporting other supports, 13 of the 26 mentioned either *training or support from colleagues as being helpful*. Here are some illustrative comments:

> Our school district’s Director of Curriculum and Instruction.

> Support from a colleague who is also using the program. Support from group of teachers using the program within the county.

> Our literacy coach introduced it to me, told me she thought it was great and would help me with a subject I wanted to improve my students’ skills with. We watched part of it, and I decided to use the lesson with my class.

The teacher survey data included teachers’ reports of how they used the solution, the supports they received, how using the Wave II solution affected their practice, and the effects that the solution had on their students. We conducted exploratory analyses examining relationships among these variables.

First, we examined at the relationship between various aspects of teacher support and teacher behavior and reported changes in instructional practice. Statistically significant results (at the $p < .05$ level) were the following:

- Longer teacher training times were associated with reports of greater changes in teacher practice, approaches, and beliefs and increased connections with other teachers implementing the solution.

- When teachers experienced both longer training time and formative learning data provided by the project, greater changes were reported in the nature of the feedback given to students, subsequent lesson planning, and instructional activities.

- Teachers who reported viewing learning data more frequently also evidenced greater agreement that the NGLC solution met the learning needs of their students and that student-teacher roles had changed as a result of using it.

Additionally, most respondents found the Wave II solutions easy to use (Table 10).

**Table 10. Rating of the Ease of Using the Wave II Solution with Students**

<table>
<thead>
<tr>
<th>Ease of Use</th>
<th>% of 218 Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very easy</td>
<td>24</td>
</tr>
<tr>
<td>Easy</td>
<td>53</td>
</tr>
<tr>
<td>Difficult</td>
<td>20</td>
</tr>
<tr>
<td>Very difficult</td>
<td>3</td>
</tr>
</tbody>
</table>
System Data Access and Use

One of the components of the Wave II theory of action was teachers’ use of data from embedded formative assessments to improve and personalize the instruction of students. A number of items on the teacher survey addressed this issue.

- **More than three-fourths (80%) of the teacher survey respondents indicated that they did have access to this type of data.** The remaining respondents indicated that their Wave II solution did not provide data on student performance (20%).
- **Of those 117 respondents who reported that they did review student performance data, about two-thirds (66%) reported that they accessed the data at least once a week.** About a third (32%) responded that they viewed the data infrequently, once a month or less.
- **Of those respondents who rarely or never used the data (once a month or less), the most frequently cited reason was that they relied on other information** such as observing students (17%).

Respondents were asked to rate the level of influence that viewing the Wave II solution student data had on a variety of common teaching tasks and processes (Table 11). The main influences were on instructional planning and the feedback to students. In addition, over half the respondents said that the solution data affected their instructional approach either somewhat (36%) or a great deal (26%). The student performance data presented were less likely to influence teachers’ grading.

**Overall, just over half (54%) of the teachers surveyed indicated that they used data from their Wave II solution in their instruction; those who reported using the data did so in ways that the Wave II initiative hoped to support.**

### Table 11. Rating the Impact of Student Performance Data on Instructional Tasks and Processes

<table>
<thead>
<tr>
<th>Task/Process</th>
<th>Percentage of 117 Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A great deal</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Instructional approach</td>
<td>26</td>
</tr>
<tr>
<td>Grading</td>
<td>14</td>
</tr>
<tr>
<td>Frequency of feedback to students</td>
<td>30</td>
</tr>
<tr>
<td>Nature of feedback to students</td>
<td>37</td>
</tr>
<tr>
<td>Instructional planning</td>
<td>38</td>
</tr>
</tbody>
</table>


Perceived Effects on Teacher Practice

Figure 6 shows teachers’ agreement with survey items that address their perceptions of how using the Wave II solution affected them. Although many more teachers reported that the solution affected them somewhat rather than a great deal on each of the dimensions in the survey, the combined effects are still overwhelmingly positive. Areas of greatest perceived impact were sense of effectiveness as a teacher, encouragement to apply new principles or approaches, and altered student-teacher roles in the classroom. A majority of survey respondents reported that using the Wave II solution made them at least a somewhat more effective teacher.

Figure 5. Teachers’ perceptions of how much the Wave II solution influenced their practice
Perceived Effects on Students

A large majority of teacher survey respondents (81%) either agreed or strongly agreed with the statement, “Students were highly engaged while using the solution” (Figure 7). The statements with the next highest levels of teacher agreement were “Has strong connections with the CCSS” (80%), “Students feel like they are learning with the solution” (78%), and “Students enjoy using the solution” (78%).

Figure 6. Teacher agreement about how students interacted with the NGLC solution

Turning to teachers’ perceptions of the effects of the Wave II solutions on students, there were a number of statistically significant relationships. Teachers reported stronger perceptions of student gains relative to traditional classes without the solution if they

- Were using a Wave II solution targeting science
- Were using a solution designed to be used for more hours
- Spent more time in project-provided training or preparing for teaching with the NGLC solution
- Had their students spend more time during the school day with the solution
- Looked at project data more frequently.

A great number of relationships were tested, and some number of them could be expected to be statistically significant just by chance. Also, the existence of a significant correlation
does not prove that one of the variables caused the other. Among the Wave II projects, for example, those that targeted science also were designed for longer usage time, making it impossible to disentangle these two design features. Further, the interrelationships among design and implementation variables can be complex. For example, it could be that teachers who looked at project-supplied learning data early on and saw something positive were encouraged both to use the intervention more and to look at project data more often.

Teachers were asked about their perceptions of student performance (perceived gains using the Wave II innovations as compared to the traditional class without the innovation). Roughly two-thirds of teachers thought that their students learned somewhat or significantly more with the Wave II project solution. Only 6% thought that their students learned less with it (Table 12).

<table>
<thead>
<tr>
<th>Comparison</th>
<th>% of 218 respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significantly less with project solution</td>
<td>1</td>
</tr>
<tr>
<td>Somewhat less with project solution</td>
<td>6</td>
</tr>
<tr>
<td>About the same with project solution</td>
<td>24</td>
</tr>
<tr>
<td><strong>Somewhat more with project solution</strong></td>
<td><strong>56</strong></td>
</tr>
<tr>
<td>Significantly more with project solution</td>
<td>13</td>
</tr>
</tbody>
</table>

It may seem surprising that teachers had such a positive view of the innovations’ effects on student learning when the results on standardized tests were negligible at best for most projects. The bases for teachers’ positive perceptions of the innovations’ influence on student learning were largely informal, with 78% of respondents citing observations or conversations with students as the basis for their judgment. Teachers also said that they looked at student performance on the assessments embedded in the software, on other coursework, and on other assessments in gauging how much their students were learning (Table 13).

<table>
<thead>
<tr>
<th>Basis of Judgment</th>
<th>% of 218 Respondents*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Observations or conversations with students</strong></td>
<td>78</td>
</tr>
<tr>
<td>Student performance on the assessments within project solution</td>
<td>40</td>
</tr>
<tr>
<td>Student performance on other assessments</td>
<td>40</td>
</tr>
<tr>
<td>Student coursework/homework</td>
<td>39</td>
</tr>
<tr>
<td>Student performance on assessments I developed</td>
<td>36</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
</tr>
</tbody>
</table>

* Respondents checked all that applied and so values may exceed 100%
Of those teacher respondents citing other bases for their judgments, 4 of the 15 mentioned using observational processes. Sample reflections are as follows.

- Listening to student discussions where they explain to other students their strategies for solving puzzles within the game.
- Observation of the students during the process and the Lead teacher feedback.
- Observations of students whose command of fractions is nil were still able to work through the cafeteria problems. That is an achievement.
- Attitudes towards math in general; which is an awesome achievement - wish I had learned about a lot sooner.
- Rate that they move through the content and their overall grades.

One interpretation of the inconsistency between these two data sources is that teachers are poor judges of their students’ achievement gains. A recent meta-analysis (Südamp, Kaiser, & Möller, 2012) summarizing the correspondence between teacher judgment of student academic achievement and actual achievement as measured by an objective test suggests that teachers are far from perfect judges, but are positively and moderately well correlated with objective tests (.63). For the Wave II solutions, it is also possible that teachers were judging student learning with respect to the competencies targeted by the interventions, and hence their assessments were better aligned with the interventions than the assessment instruments used in the evaluation.

Another way to characterize teachers’ satisfaction with an NGLC solution is to look at their plans for future use. A large majority of teachers—86%—of survey respondents—said that they would use the NGLC solution again. Of these, 36% expected to expand their use of the solution, while the remaining teachers expected a level of use similar to that in the current year.

Although positive about future use of the NGLC solutions, 40% of teachers did say that they would make major changes in the way they used the solution the next time. The kinds of changes that they said they would make generally concerned reducing the time allocated to using the solution or aligning it better with their curriculum.

Another indicator of a positive experience with the NGLC innovation was a teacher’s willingness to recommend it to a friend. Again, the Wave II teachers displayed a very positive attitude—more than 90% said that they would recommend the NGLC innovation they had used to a friend. A selection of respondents’ descriptions of why they would recommend the NGLC solution is as follows.
I think it’s definitely higher level thinking. It challenges the students to learn and produce at a higher level without them even being aware of it. I wish I had it for all my classes every day. It’s keeping their attention, keeping them focused, and raising reading levels.”

Makes academic vocabulary instruction entertaining and engaging.

Despite my own frustrations with trying to integrate the curriculum at the end of a school year, I feel that the project was a useful outlet for students and a way to review skills taught in a different, more life-like atmosphere.

As for the students, their level of engagement increased dramatically. They also learned to be responsible in a group setting. Most never worked this much in a group, and had to learn many social skills to be successful!

**Overall, results from the teacher survey suggest a high degree of satisfaction on the part of participating teachers.**
6. Summary and Recommendations

Findings

Project Features and Functions

Many Wave II innovations were designed for implementation in mathematics classes, but relatively few were designed for English classes. Among the 19 Wave II projects, 12 were intended for math classes, 10 for social studies classes, 6 for science classes, and just 4 for English classes. The CCSS for English language arts includes comprehension of readings in subject areas such as social studies and science, as well as such competencies as comparing texts in different genres and analyzing the effects of specific word choices that are typically covered in English classes.

Nearly all the Wave II interventions incorporated embedded formative assessments, and most had some kind of dashboard showing learning data for individual students and entire classes. When asked about the features of their innovations, 89% of principal investigators reported that they had included embedded formative assessments, and 74% said their product included a teacher dashboard.

Many of the Wave II innovations included advanced technology features such as pedagogical agents, simulations, and gaming. Roughly half the Wave II products included each of these features; a third of the products used adaptive, intelligent tutoring. One project incorporated kinesthetic, multimodal experiences with an “embodied interactive whiteboard.”

Student Learning Gains

A meta-analysis on the estimates of learning effects that could be generated for 12 projects found no discernible impact on student learning outcomes for Wave II projects as a whole. Projects’ learning effects were estimated using a range of difference assessments: NWEA’s MAP, state assessments, other standardized assessments, or project-developed assessments. At the project level, three projects appeared to produce learning outcomes that were poorer than outcomes for students receiving instruction without the NGLC innovation, and two projects (iCivics Argumentation Modules and Worcester Polytechnic Institute’s ASSISTments) had significant positive effects.

Teachers nevertheless perceived the Wave II innovations as effective. Asked to compare the gains their students made with the Wave II project solutions with those of the traditional class without the project solution, 70% of teacher survey respondents thought their students learned somewhat or significantly more with the Wave II project solution.

The lack of alignment between the innovative, focused, short-term interventions of Wave II and the full-year content in mathematics and language arts sampled in standardized and state tests limited the prospects for finding positive impacts. Wave II of NGLC sought to identify innovations that could positively affect student achievement on the CCSS on the one hand and demonstrate innovative, technology-supported approaches
to teaching and learning on the other. The tension between these two goals was not recognized at the outset of the initiative, with the result that the projects and the main student outcome measure were incompatible. The assessment used for evaluating learning outcomes for most projects (the Massachusetts version of NWEA MAP) was judged the best available proxy for a test of CCSS when the evaluation was launched in 2011. Most of the Wave II projects, however, did not address all the CCSS in the relevant subject area. Many focused on particular topics, such as physics, argumentation on civic issues, or laws of motion, which were assessed either by only a very small number of items or not at all on the assessments used to measure learning.

**SRI found no existing assessments appropriate for measuring deeper learning goals across the Wave II projects.** Although the lack of such measures limited the evaluation’s ability to indicate the impact of the Wave II portfolio on deeper learning, it had little practical consequence for individual projects, which confined their treatment of deeper learning to acquisition of skills in the particular subject areas their innovation covered. The majority of projects treated deeper learning progress in content and skills in the particular subjects covered by their innovation.

**Implementation**

**Nearly all Wave II project leaders reported learning a great deal about school learning environments and the IT infrastructure of schools, consequently building their organizations’ research and development capacity.** Of the 19 projects, 17 reported that they learned something that would aid them in designing better learning modules or implementation plans. Some projects realized that high-needs schools required additional implementation support (for example, additional software development to retrofit solutions to work with older versions of computer hardware), while others discovered that they had to negotiate with school administrators to facilitate access to computer labs. Start-up companies’ and other small project teams’ Wave II projects often involved learning how to work in schools, including gaining an appreciation of the constraints on teachers’ decision-making about the use of class time and district policies on research and data collection. Although some projects’ lack of experience working in school settings led to some false starts and overly optimistic initial plans, the Wave II experience helped these organizations build capacity for doing school-based work. Several project leaders expressed a strong desire to continue participating with the NGLC community.

**The original timeline for Wave II appears to have been too tight for the level of maturity of some of the innovations.** This was evidenced by the fact that 11 of the 19 projects requested (and received) no-cost extensions. The original timeline called for all projects to have completed their classroom solution implementations by June 2012; instead, five projects implemented solutions in classrooms during the 2012–13 school year. Major reasons for delays were difficulty recruiting schools, problems with school technology infrastructures, and the need for more software development.

**Nearly all Wave II projects provided the teachers implementing their innovation with appropriate training and support.** All but one of the projects provided teacher training, and the median number of training hours was more than 8. Teachers responding to SRI’s
survey indicated that the Wave II grantee organizations were their greatest single support for implementing the innovation.

**Technology challenges were the biggest impediment to implementing the Wave II innovations. According to teachers, buggy software was the source of most technical difficulties.** However, other sources of difficulty such as unreliable Internet connections, firewall constraints, lack of bandwidth, and lack of access to the needed number of computers were cited as well.

**A majority of teachers implementing the Wave II innovations reported that the experience improved their teaching practice and enhanced their students’ learning.** Teachers participating in Wave II were very positive about the innovations they worked with even while noting software bugs and ways they could have improved their implementation of the solutions. Large majorities said they would use the innovation again (86%) and that they would recommend it to colleagues (90%).

**Although 80% of teachers reported having access to student data from their Wave II learning product, only a minority of teachers reported that the data influenced their instructional approach or the feedback they provided students.** The use of student data available on product dashboards was not a major focus of the training provided to Wave II teachers. System student data were accessed once a week or more by 35% of the Wave II teachers. Among these teachers, two-thirds reported using the data in ways that supported the Wave II goals of more frequent and better feedback to students and more personalized instruction.

**The original timeline for Wave II appears to have been too tight for the level of maturity of the innovations.** This was evidenced by the fact that 11 of the 19 projects requested (and received) no-cost extensions. The original timeline called for all projects to have completed their classroom solution implementations by June 2012; instead, five projects implemented solutions in classrooms during the 2012–13 school year. Major reasons for delays were difficulty recruiting schools, problems with school technology infrastructures, and the need for more software development.

**Implementing technology-based innovations and collecting data on their effectiveness appears to be particularly challenging in high-needs school districts.** Often such districts have limited capacity to provide supports such as time for teacher training and joint planning, curricular accommodations, time for administering additional assessments, and release of test records. Constrained by their students’ low test scores and an accountability system based on student performance on high-stakes tests, such districts fear losing instructional time directed toward the content of these tests to new activities or curricular materials or to taking the assessments that are part of an evaluation. Monetary incentives alone are insufficient to overcome these obstacles.

**Recommendations**

**Designers of technology-supported innovations should start with a clear conception of the role that their product will play in the classroom.** Digital technology is flexible enough to support many kinds of learning and address almost any content, but only products that address schools’ learning goals in a time-efficient manner will win
widespread adoption. Developers need to identify specific places in the curriculum where their products fit and be able to make the case for the time they want students to spend with their products. Developers need to be clear about whether their product is intended as a core curriculum, a curriculum supplement, or a replacement unit and to design for a usage pattern fitting that role.

**Collaborations with researchers and teachers can help technology developers design innovations that enhance learning and are feasible for classroom implementation.** While consumer technologies are a success if people use (or buy) them, learning technologies are not successful unless they actually enhance learning efficiency, learning outcomes, or both. Measuring learning outcomes requires assessments of learning and a skill set that is uncommon among technology developers. Similarly, developers often lack insight into likely student behaviors and the many constraints imposed by school settings and practices. Collaborative design and development teams bringing together researchers, practitioners, and technology developers and implementing early piloting and iterative cycles of planning, doing, and data analysis are most likely to produce successful technology-supported innovations (Means et al., in press).

**Projects implementing digital learning systems featuring teacher dashboards should train teachers on how to use the data in their practice.** Most teachers are not accustomed to using detailed student learning data in their day-to-day practice. Both research demonstrating the impacts on learning of using such data in instructional planning and of providing feedback to students and attention to these practices in teacher training and supports would most likely increase the proportion of teachers taking advantage of this technology affordance.

**Future Next Generation Learning initiatives should attend to the issue of matching project learning goals to outcome measures before issuing requests for proposals.** When funding a set of projects with similar general goals but a wide range of designs for attaining those goals, the foundation can pursue either of two strategies for obtaining evidence of learning impacts. Either an assessment or set of outcome measures for use across all projects can be identified at the outset and clearly specified in the request for proposals or projects can be allowed to identify their own outcome measures aligned with their specific goals. If the first strategy is chosen, funding decisions should take the proposed innovation’s fit with the specified learning measure into account. If the second strategy is pursued, portfolio-wide analyses will be limited to meta-analytic approaches, but the likelihood that an early-stage innovation will be able to demonstrate learning effects is increased.

In future project portfolio evaluations, we recommend using standardized achievement tests as outcomes only if the project interventions align with the majority of content in those tests and are of sufficient duration to have a likely impact on such measures. For shorter term interventions and especially those targeting learning outcomes that are not measured well by standardized tests, the use of project-developed assessments is advised at the proof-of-concept stage. As interventions move into scaling, using a targeted assessment developed by third-party assessment experts can enhance the technical qualities of the measure and enhance credibility.
**MAP Virtual Comparison Groups (VCGs) should not be relied on as the counterfactual for short-term innovations.** According to NWEA, the minimum time between test events where a VCG group can be formed is 10 weeks (suggesting receipt of approximately 50 hours of instruction). Many innovative technology-based learning activities, like those in Wave II, are designed for shorter durations. Even when the innovation is used over a long enough time frame and with sufficient intensity, the VCG is less than optimal as a counterfactual because of the lack of student-level data that would permit ascertaining the comparability of the VCG and the treatment group. In forming a VCG, urbanity and the proportion of students eligible for free or reduced-price lunch at the students’ school are controlled for, but the only student-level variables controlled for are grade and MAP pretest score.

**When funding early-stage Next Generation Learning projects, the foundation should consider building in a cycle of refinement after initial implementation with impact measured for the second implementation.** The Wave II innovations differed greatly in their maturity, and many of them had software bugs that posed challenges for teachers. In addition, many teachers noted that they would have had a better idea of how to use the software if they had been implementing it a second time. The more innovative a learning product, the heavier the demand for teachers to adopt new practices and new ways of thinking about how students learn. The importance of getting feedback from users and of iterating on a product’s design is well known in industry. Delaying the analysis of impact data until the second iteration of an education innovation would reduce the likelihood of underestimating the real potential of a new approach.
References


Appendix A

The following pages provide individual grant project summary reports. They are presented by grant category, Proof of Concept followed by Early Stage Adoption both in alphabetical order.

We used several sources of information to provide the summary snapshot of the project.

- Principal Investigators provided data including interviews, progress reports, and surveys. They also had an opportunity to review the data and confirm accuracy of the summary information.
- Teacher Survey results.
- Project submitted final reports to EDUCAUSE

There are 7 grant projects for which we report only limited Teacher Survey information because the number of survey respondents was below 5. Research reporting protocols (IRB) allow us to report aggregated results for groups of 5 or more participants only.

The number of participants reported is based on the number of students and teachers participating in the SRI conducted evaluation unless noted otherwise. In some cases the number of students and teachers served far exceeded the number of research participants.

Instructional time data and the participants’ role with respect to implementation were included to provide basic information about the length of project implementation.

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1 Jennifer Van Brunt, Gloria I. Miller, and Ying Zheng contributed to Appendix A. We also acknowledge and thank the project leaders and teams.
Grantee Organization Name: CAST, Inc. / UDL Physics Module

Title: Universal Design for Learning Modules: Supporting Literacy in Physics

Targeted subjects: Physics

Targeted Common Core: Math ☑ and/or ELA ☒

Project description: The Supporting Literacy in Physics modules embed into physics content learning supports and scaffolds based on universal design for learning principles. These online modules are enhanced with learning analytics and assessments to help monitor student progress. Content is presented through various multimedia representations, and interactive features are designed to help students highlight the big ideas. There is a section where students can keep written notes and a graphic organizer for displaying the connections among different concepts.

Specific features provided: Pedagogical agents; Digital notebook (online notes or resource depository/organizer); Interactive whiteboard; Embedded formative assessments; Embedded summative assessments; Options for students to ask for hints, definitions, alternative presentation features; Student materials in print/physical materials/instruments; Student(s)-to-teacher social media; Dashboard providing teacher with learning data for each student and whole class; Specific guidance for teachers on how to integrate the technology with their instruction. (Source: PI Survey)

Project implementation: February 2012 - May 2012


Wave II Implementation Activity
(Source: SRI data collection - Teacher survey and PI survey)

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Proposal</th>
<th>Projected*</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Districts</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Schools</td>
<td>NR³</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Teachers</td>
<td>3</td>
<td>NR</td>
<td>1</td>
</tr>
<tr>
<td>Students</td>
<td>100</td>
<td>60-80</td>
<td>48</td>
</tr>
</tbody>
</table>

*Projected figures are from the Implementation Schedule report Oct 13, 2011.
³ NR = not reported

Did project meet target student numbers? -52

- Administered NWEA MAP assessment
- Included in Wave 2 meta-analysis

Instructional time

<table>
<thead>
<tr>
<th>Teacher</th>
<th>PI reported</th>
<th>Teacher reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average during school (minutes)</td>
<td>30</td>
<td>35</td>
</tr>
<tr>
<td>Average outside of school (minutes)</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>Average number of weeks used</td>
<td>11.7</td>
<td>7</td>
</tr>
<tr>
<td>Total average instructional time (hours)</td>
<td>18.6</td>
<td></td>
</tr>
</tbody>
</table>

* Collected from PI survey in 2012
** Collected from teacher survey in 2012

CAST - UDL Physics Module Final Report
(Source: EDUCAUSE data collection)

Research design
- Classroom observation
- Interview with teacher and students
- User Statistics: Electronic Usage Log
- Pre-post test
- Massachusetts Comprehensive Assessment System (MCAS) assessment (data for treatment students only)

Specific student findings
- Significant improvement in physics understanding from pre- to post-test
- Significant improvement in motivation for science from pre- to post-test
- MCAS assessment: student did significantly better on multiple-choice questions targeted by UDL than other MCAS items

Specific teacher findings: None reported.
<table>
<thead>
<tr>
<th>Greatest barrier</th>
<th>Future plans for scaling</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Students were not adept at understanding how to interpret their &quot;data&quot;.</td>
<td>• Physics module is now available for public use</td>
</tr>
<tr>
<td></td>
<td>• Need strong partners and future funding to work on issues of sustainability and interoperability.</td>
</tr>
</tbody>
</table>

**SRI Teacher Survey Summary**

*(N = 1): The sole participant was a classroom teacher.*

We are not able to present any further results in this area because the number of respondents was less than 5.
Grantee Organization Name: Classroom, Inc. / The Sports Network 2

Title: The Sports Network 2 - Reading in the Real World

Targeted subjects: English/Writing/Language Arts

Targeted Common Core: Math and/or ELA

Project description: The Sports Network 2 – Reading in the Real World is a virtual sports network where students take on the role of the managing director. They experience the working environment through a series of activities structured as five simulated workdays. Students make decisions after reading emails, reports, and staff briefs. Besides focusing on reading skills, students also have opportunities to practice collaborative problem solving skills as they discuss the issues with avatar staff. A teacher dashboard enables progress monitoring by showing assessment data on four Common Core reading standards for individual students or the whole class.

Specific features provided: Gaming technology; Simulation technology; Intelligent tutoring (adaptive tutorial system); Digital notebook (online notes or resource depository/organizer); Embedded formative assessments; Options for students to ask for hints, definitions, alternative presentation features; Dashboard providing teacher with learning data for each student and whole class; Specific guidance for teachers on how to integrate the technology with their instruction. (Source: PI Survey)

Project implementation: March, 2012 - June, 2012


Wave II Implementation Activity
(Source: SRI data collection - Teacher survey and PI survey)

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Proposal</th>
<th>Projected*</th>
<th>Actual</th>
<th>Instructional time</th>
<th>PI reported*</th>
<th>Teacher reported**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Districts</td>
<td>3</td>
<td>NR</td>
<td>7</td>
<td>Average during school (minutes)</td>
<td>45</td>
<td>54.11</td>
</tr>
<tr>
<td>Schools</td>
<td>4</td>
<td>NR</td>
<td>8</td>
<td>Average outside of school (minutes)</td>
<td>0</td>
<td>3.33</td>
</tr>
<tr>
<td>Teachers</td>
<td>NR¹</td>
<td>NR</td>
<td>14</td>
<td>Average number of weeks used</td>
<td>8.8</td>
<td>7.89</td>
</tr>
<tr>
<td>Students</td>
<td>175</td>
<td>150</td>
<td>364</td>
<td>Total average instructional time (hrs)</td>
<td>15.38</td>
<td></td>
</tr>
</tbody>
</table>

*Projected figures are from the Project Milestones report Jan 2012.¹ NR = not reported

Did project meet target student numbers? 189

Administered NWEA MAP assessment ✗
Included in Wave 2 meta-analysis ✗

Research design
- Project created embedded assessment
- Online post-program Student Survey (n = 117)
- Qualitative observations

Specific student findings
- Effect size using NWEA MAP on average, showed less growth compared to VCG
- Moderate to strong correlations between students’ scores on the TSN-2 embedded assessments and MAP reading scores provide compelling evidence that TSN-2 does indeed address and assess reading comprehension.
- When students were routed from main activity to support activities, they did better on those activities, as intended; conversely, when students moved to challenge activities, they did more poorly on them.
- 72% of students would recommend that friends use The Sports Network 2 in their coursework.

Specific teacher findings
- Site visitors reported that 67% of teachers consistently looked at the Dashboard as students were using TSN-2.
- Site visitors reported that 83% of teachers were aware of how TSN-2 was helping their students meet selected CCSS.
- All teachers from the site visits asked about using TSN-2 after the pilot.
Greatest barrier
• Problematic experience with the use and administration of MAP assessment.
• Small number of matched pre and post-MAP data.
• Concerns about validity and suitability of the “virtual comparison group” data provided to evaluators (SRI) by NWEA for MAP interpretation.

Future plans for scaling
• The Sports Network 2 has potential interest in the spring rollout from eight New York City schools, and is promoting the product’s availability in selected forums and on our website, to attract new users.
• The Sports Network is actively beginning partnerships with several organizations to help disseminate the program via online venues.

Teacher Survey Summary
(N = 9): Of the 9 respondents, 89% are classroom teachers, while 11% are computer lab instructors or specialists.

Student gains
For the areas targeted by The Sports Network 2, how would you compare student gains as a result of using The Sports Network 2 to expected gains in a traditional class without it?

Student needs and engagement

Percent of teachers agreeing with the statement

Training: 88.89% of the teachers surveyed participated in some aspect of the training. Of these teachers, most of them (62.5%) got from 3-9 hours, and the rest of them (37.5%) got between 2 hours or less.

Value of training

Teachers’ rating of the training

Impact
“It is a great topic, or premise for a reading game on the junior high-high school level, because it involves something an all male class can connect with- sports. The game is also positive in that it is created in a "Sims"-like (for lack of a better word) environment that kids who are into gaming are familiar with.”

Recommendation
“I think it’s definitely higher level thinking. It challenges the students to learn and produce at a higher level without them even being aware of it. I wish I had it for all my classes every day. It's keeping their attention, keeping them focused, and raising reading levels.”

Challenges
“The program was very isolating. Students did not interact at all. The program is meant for a much larger class than the one I taught. Students were also able to utilize other internet features and were severely distracted by music programs and youtube. Major changes need to be made before I would consider using this program again.”
Grantee Organization Name: DaVinci Minds / WhyCareers


Targeted subjects: Career/technical, General science, Mathematics

Targeted Common Core: Math X and/or ELA □

Project description: WhyCareers Energy is a virtual power plant for eighth-grade students inside of the larger world of Whyville.net. Through exploration of careers in traditional and renewable energy fields, students are introduced to topics and problems related to math and science, with a focus on fractions, ratios, proportions, and multiplicative thinking. Lesson plans are mapped to math, science, and career education. Student tools include links to local career pathways and educational resources.

Specific features provided: Gaming technology; Simulation technology; Embedded formative assessments; Student materials in print/physical materials/instruments; Student-to-student social media; Student(s)-to-teacher social media; Dashboard providing teacher with learning data for each student and whole class; Specific guidance for teachers on to how to integrate the technology with their instruction. (Source: PI Survey)

Project implementation: April 2012 - May 2012


Wave II Implementation Activity
(Source: SRI data collection - Teacher survey and PI survey)

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Proposal</th>
<th>Projected*</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Districts</td>
<td>NR¹</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Schools</td>
<td>NR</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>Teachers</td>
<td>NR (48 classes)</td>
<td>1182</td>
<td>874</td>
</tr>
<tr>
<td>Students</td>
<td>1050</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Projected figures are from the Implementation Schedule report October 13, 2011. ¹ NR = not reported

Did project meet target student numbers? -176

Administered NWEA MAP assessment ✔

Included in Wave 2 meta-analysis ✔

Instructional time

<table>
<thead>
<tr>
<th>PI reported*</th>
<th>Teacher reported**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average during school (minutes)</td>
<td>40</td>
</tr>
<tr>
<td>Average outside of school (minutes)</td>
<td>20</td>
</tr>
<tr>
<td>Average number of weeks used</td>
<td>5.9</td>
</tr>
<tr>
<td>Total average instructional time (hrs)</td>
<td>26.83</td>
</tr>
</tbody>
</table>

*Collected from PI survey in 2012
** Collected from teacher survey in 2012. One teacher's response is out of range, so it is not included (n = 12)

Research design

• WhyPower Student Connect Worksheets
• Pre- and post- DaVinci Minds Student Math Attitudes, adapted from Modified Fennema-Sherman Math Attitudes Scale.
• DaVinci Minds Teacher Pedagogy survey, adapted from Teacher Attitudes Survey developed by the Teacher Academy for Mathematics and Science.
• Professional Development Surveys
• Effect size using NWEA MAP on average, showed no difference compared to ANG

WhyCareers Final Report
(Source: EDUCAUSE data collection)

Specific student findings (As measured by DaVinci Minds Student Math Attitudes assessment)

• Significant increase in the degree to which students think about what type of job they will pursue in the future (p < .05).
• Improved student perception of mathematics for students previously undecided. (Two measures at p < .01; two measures at p < .05).
• Increased student interest in careers involving math for those previously undecided. (Two measures at p < .01).

Specific teacher findings (As described in a qualitative ethnographic study conducted by DaVinci Minds)

• Administrative and pedagogical skills in teachers are both required for successful and measurable interventions.
• Increased support for experimenting with innovations. Likert score, 13% increase, not statistically significant.
• Increased support for the appropriateness of career guidance, and provision of tools. Likert score, 13% increase, not statistically significant.
• Belief that students are more easily engaged in STEM learning. Likert score, 14% increase, not statistically significant.
### Greatest barrier
- Some teachers did not fully understand the pedagogical framework of the lessons.
- MAP test was not effective. It competed with the intervention and created selected negative attitudes towards it.
- NWEA MAP implementation was not supported by NWEA very well.
- Use of online assessments that required new tools, logins, and setup by school IT departments was problematic.

### Future plans for scaling
- Complete products including marketing materials and website.
- Continue enhancement of materials, both visually and in terms of content quality.
- Increase communications about the project innovation; includes publishing research findings and dissemination of recommendations.
- Look for venture financial support.

### SRI Teacher Survey Summary
\[(N = 13)\]: Of the 13 respondents, 100% are classroom teachers.

#### Student gains
For the areas targeted by WhyCareers, how would you compare student gains as a result of using WhyCareers to expected gains in a traditional class without it?

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Percent of Respondents (n = 13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>significantly more with it</td>
<td>0%</td>
</tr>
<tr>
<td>somewhat more with it</td>
<td>10%</td>
</tr>
<tr>
<td>about the same with it</td>
<td>20%</td>
</tr>
<tr>
<td>somewhat less with it</td>
<td>30%</td>
</tr>
<tr>
<td>significantly less with it</td>
<td>40%</td>
</tr>
</tbody>
</table>

#### Student needs and engagement
Percent of teachers agreeing with the statement

<table>
<thead>
<tr>
<th>Statement</th>
<th>Percent of Respondents (n = 13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students enjoy using it</td>
<td>100%</td>
</tr>
<tr>
<td>Students are highly engaged while using it</td>
<td>100%</td>
</tr>
<tr>
<td>Students have sufficient time to use it</td>
<td>100%</td>
</tr>
<tr>
<td>It meets the learning needs of my students</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Training
100% of the teachers surveyed participated in some aspect of the training. Most teachers (76.92%) got from 3-9 hours, and some teachers (15.38%) got between 20-39 hours of training.

#### Value of training

<table>
<thead>
<tr>
<th>Teachers' rating of the training</th>
<th>Percent of Respondents (n = 13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>extremely valuable</td>
<td>100%</td>
</tr>
<tr>
<td>very valuable</td>
<td>100%</td>
</tr>
<tr>
<td>moderately valuable</td>
<td>100%</td>
</tr>
<tr>
<td>slightly valuable</td>
<td>100%</td>
</tr>
<tr>
<td>not at all valuable</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Impact
“The students learned about future career possibilities and the courses they will need to prepare them for those careers. Also, they learned about the environmental impact of power/energy production and usage. It made the students more aware of these elements.”

“It was a new way for students to discover and understand the math and science that is in the career.”

### Recommendation
“I would recommend WhyCareers because the students are exposed to new material in an inquiry type learning environment. The students really enjoy the program and learned a lot from it.”

### Challenges
“Most teachers don’t have access <sic> to computers in the classroom on a day to day basis.”
Grantee Organization Name: EdNovo.org

Title: Gooru Enrichment Program for Students in Grade 7 Math and Science Subjects

Targeted subjects: Mathematics, STEM

Targeted Common Core: Math ☑ and/or ELA ☑

Project description: The Gooru project developed a searchable library of resources, with an organizer that creates a customized collection of lessons, practice exercises, and quizzes to support personalized student learning. The resources in the library include video mini-lessons, simulation applets, individual problems and problem sets, exercises, and assessments.

Specific features provided: Digital notebook (online notes or resource depository/organizer), Options for students to ask for hints, definitions, alternative presentation features, Teacher customizable assessment system. (Source: PI Survey)


No-cost extension: Yes. Grant period extended to March 31, 2013.

Wave II Implementation Activity
(Source: SRI data collection - Teacher survey and PI survey)

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Proposal</th>
<th>Projected*</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Districts</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Schools</td>
<td>NR</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Teachers</td>
<td>48</td>
<td>3</td>
<td>4**</td>
</tr>
<tr>
<td>Students</td>
<td>1000</td>
<td>NR</td>
<td>47**</td>
</tr>
</tbody>
</table>

*Projected figures are from the Implementation Schedule report October 2011.
**Actual number of users served is much larger including an international audience. These numbers reflect NWEA MAP participants only.
1 NR = not reported

Did project meet target student numbers? N/A
Administered NWEA MAP assessment ☑
Included in Wave 2 meta-analysis ☑

<table>
<thead>
<tr>
<th>Instructional time</th>
<th>PI reported*</th>
<th>Teacher reported**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average during school (minutes)</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>Average outside of school (minutes)</td>
<td>22</td>
<td>22.50</td>
</tr>
<tr>
<td>Average number of weeks used</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>Total average instructional time (hrs)</td>
<td>25.50</td>
<td></td>
</tr>
</tbody>
</table>

*Collected from PI survey in 2013
**Collected from teacher survey in 2013 (N = 4).

Did usage meet PI expectation?
Teacher usage | Less than expected
Student usage | More than expected

Gooru Final Report
(Source: EDUCAUSE data collection)

Research design
• Project relied on SRI evaluation for overall evaluation
• Collected user data and teacher user feedback that was not reported in the final report

Specific student findings as measured by NWEA MAP
• Effect size indicated less growth than the VCG

Additional findings (Not reported in final report, but provided additional information)
• Students prefer interactive- and question-based digital resources, particularly games and visually appealing interactives.
• Students also enjoy exams and other question-based resources that allow them to establish friendly competition with their classmates.
• Students often view Gooru as a tool to reinforce their understanding of new concepts, and prefer studying material that parallels the content covered during their classes.
• Students respond positively to structure, and prefer when each resource in the collection communicates specific goals through Gooru’s narration feature.
### Specific teacher findings (Not reported in final report, but provided as additional information)
- Teachers favor the ability to search for individual resources, as opposed to "collections".
- Teachers prefer to customize and build their own collections, rather than solely discover pre-assembled collections.
- Workshops and trainings are a critical part of introducing technology to teachers and ensuring usage throughout the school year.
- New products must provide teachers with tools that will enhance the quality of their teaching while reducing their 'prep' time.

### Greatest barrier
- Per interviews with project team - recruiting schools as part of the research agenda
- Implementation - teachers have competing priorities

### Future plans for scaling
- Scale operations in content development, school programs and product

### SRI Teacher Survey Summary

*(N = 4)*: Three participants are classroom teachers and one indicated other. We are not able to present any further results in this area because the number of respondents was less than 5.
**Grantee Organization Name:** Education Development Center / **Wordplay Games**

**Title:** *Wordplay Games: Building Word Knowledge in the Core Content Areas*

**Targeted subjects:** English/Writing/language arts, General Science, Social Science/History

**Targeted Common Core:** Math and/or ELA

**Project description:** *Wordplay Games* consist of two digital games and related curricular materials that target instructional support for middle grade students and their teachers on vocabulary development. Both games are geared to provide students with experiences that promote understanding of words with multiple meanings, learning how to derive meaning from context, and practice developing overall strategies for sense making.

**Specific features provided:** Gaming technology; Embedded summative assessments; Options for students to ask for hints, definitions, alternative presentation features; Student materials in print/physical materials/instruments; Dashboard providing teacher with learning data for each student and whole class; Specific guidance for teachers on how to integrate the technology with their instruction. (Source: PI Survey)

**Project implementation:** May 4, 2012 - May 30, 2012

**No-cost extension:** No. Grant period ended September 30, 2012.

### Wave II Implementation Activity

(Source: SRI data collection - Teacher survey and PI survey)

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Proposal</th>
<th>Projected*</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Districts</td>
<td>NR¹</td>
<td>NR</td>
<td>3</td>
</tr>
<tr>
<td>Schools</td>
<td>2</td>
<td>NR</td>
<td>3</td>
</tr>
<tr>
<td>Teachers</td>
<td>NR</td>
<td>NR</td>
<td>3</td>
</tr>
<tr>
<td>Students</td>
<td>NR</td>
<td>NR</td>
<td>295</td>
</tr>
</tbody>
</table>

*NR = not reported ¹ No projected data for these fields.

<table>
<thead>
<tr>
<th>Instructional time</th>
<th>PI reported*</th>
<th>Teacher reported**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average during school (minutes)</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Average outside of school (minutes)</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>Average number of weeks used</td>
<td>3.1</td>
<td>3.67</td>
</tr>
<tr>
<td>Total average instructional time (hours)</td>
<td>4.83</td>
<td></td>
</tr>
</tbody>
</table>

*Collected from PI survey in 2012  ** Collected from teacher survey in 2012.

**Did project meet target student numbers?**

NA

Administered NWEA MAP assessment [ ]

Included in Wave 2 meta-analysis [ ]

---

**Research design**

- Word Familiarity assessment: paper-and-pencil pre- and post-assessment to rate students’ familiarity with the words presented in the *Code Invaders* and *Cipher Force* game environments.
- Embedded pre-and post-assessment.

**Specific student findings** (as measured by Word Familiarity assessment)

- Increase in word familiarity from pre- to post- Word Familiarity assessment in English Language Art classes (P<0.0001) or Science class (P<0.08)

**Specific teacher findings:** None reported.

**Greatest barrier**

- Not able to work with two New York schools as intended, both withdrew only weeks before the start date of the field test.
- Students encountered significant networking problems when trying to play the games from home and, in some cases, from school.

**Future plans for scaling**

- Continue to refine these games through further research.
- Consider exploring variations on the game design that could address morphology.
- The games are now available on Edmodo.com.
- Technical challenges prevented our online post-assessment from producing a reliable dataset.
- Teachers were not familiar with using technology in classrooms and social studies and science teachers were unsure about how to support students’ literacy learning.
- Look to BrainPop as another dissemination partner that could make the games freely available to teachers.

**SRI Teacher Survey Summary**

*(N = 3): The three participants were classroom teachers. We are not able to present any further results in this area because the number of respondents was less than 5.*
Grantee Organization Name: Hofstra University / WISEngineering

Title: WISEngineering

Targeted subjects: Mathematics

Targeted Common Core: Math and/or ELA

Project description: WISEngineering is an online design environment that challenges middle school students to collaborate and create solutions to engineering design projects. Students work with both physical and virtual 3-D models to help refine their mathematical understanding. Each design project has a 1- to 2-week online curricular module that guides the project and focuses on a set of math standards.

Specific features provided: Simulation technology; Digital notebook (online notes or resource depository/organizer); Embedded formative assessments; Options for students to ask for hints, definitions, alternative presentation features; Student materials in print/physical materials/instruments; Dashboard providing teacher with learning data for each student and whole class. (Source: PI Survey)

Project implementation: July 2011 - August 2012

No-cost extension: No. Grant period ended on September 30, 2012.

Wave II Implementation Activity
(Source: SRI data collection - Teacher survey and PI survey)

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Proposal</th>
<th>Projected*</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Districts</td>
<td>1</td>
<td>NR¹</td>
<td>1</td>
</tr>
<tr>
<td>Schools</td>
<td>(4 classes)</td>
<td>NR</td>
<td>2</td>
</tr>
<tr>
<td>Teachers</td>
<td>2</td>
<td>NR</td>
<td>2</td>
</tr>
<tr>
<td>Students</td>
<td>100</td>
<td>NR</td>
<td>102</td>
</tr>
</tbody>
</table>

*No projected data for these fields.
¹ NR = not reported

Over/Under

Did project meet target student numbers? 2

Administered NWEA MAP assessment ☐
 Included in Wave 2 meta-analysis ☒

Instructional time

<table>
<thead>
<tr>
<th>PI reported*</th>
<th>Teacher reported**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average during school (minutes)</td>
<td>35</td>
</tr>
<tr>
<td>Average outside of school (minutes)</td>
<td>40</td>
</tr>
<tr>
<td>Average number of weeks used</td>
<td>5.5</td>
</tr>
<tr>
<td>Total average instructional time (hours)</td>
<td>48.08</td>
</tr>
</tbody>
</table>

* Collected from PI survey in 2012
** Collected from teacher survey in 2012

Did usage meet PI expectation?

Teacher usage

Student usage

Much more than expected

WISEngineering Final Report
(Source: EDUCAUSE data collection)

Research design

• Project created pre-post Math Content Knowledge Assessments for each lesson.
• Engineering Thinking Survey (exploratory): items were selected from existing surveys and additional items were developed by the project.
• Retrospective pre-post rating of self-confidence for solving math problems (exploratory).
• Final Reflection Feedback Survey: asked students to provide feedback about their WISEngineering experience
• Comparison of WISEngineering and Non-WISEngineering students' performance on selected math content knowledge questions.
• Comparison of STAR math assessment (Renaissance Learning) scores for WISEngineering and comparison students.

Specific student findings

• Effect size using STAR, ASK, and project developed on average, showed no difference between WISEngineering and comparison students.
• Students who participated in lessons showed improvements in math content knowledge for all three WISEngineering lessons (P < .01).
• Students from all proficiency levels learned the math topics necessary to improve performance on challenging math tasks.
• WISEngineering students outperformed comparison students on math content knowledge questions (p < .05).
• Preliminary evidence suggests that participating in WISEngineering may positively impact standardized test results for mathematics.
• Students reported increased ability to do mathematics tasks and perceived assessment questions to be easier after WISEngineering.
• Over 80% of the students wrote in the feedback survey that they enjoyed engaging with the design challenge through group work. 88% of students reported that they enjoyed the project.

**Specific teacher findings**
None reported in written report. During PI debriefing interview, team indicated that both teachers enjoyed the pedagogical approach and that students increased their collaborative practices.

<table>
<thead>
<tr>
<th>Greatest barrier</th>
<th>Future plans for scaling</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Severe flooding delayed implementation and damaged both school sites.</td>
<td>• Lack of additional funding is making it difficult to scale further.</td>
</tr>
<tr>
<td>• Access to the computer was restricted in one of the two schools.</td>
<td>• Continue to search for funding sources.</td>
</tr>
<tr>
<td></td>
<td>• Create new content.</td>
</tr>
</tbody>
</table>

**SRI Teacher Survey Summary**

*(N = 2): The two participants are both classroom teachers.*

We are not able to present any further results in this area because the number of respondents was less than 5.
**Grantee Organization Name:** Louisiana Department of Education / Louisiana Virtual School

**Title:** Online Algebra I - Algebra for the 21st Century

<table>
<thead>
<tr>
<th>Targeted subjects: Mathematics, Algebra</th>
<th>POC ☑ or ESA ☐</th>
</tr>
</thead>
</table>

**Targeted Common Core:** Math ☑ and/or ELA ☑

**Project description:** Online Algebra I - Algebra for the 21st Century uses a hybrid model of learning, combining face-to-face instruction with online course content. Students enroll in the class through their local school and attend on a regular schedule. The online learning modules developed for this project specifically target the Descriptive Statistics strand of the Common Core. Students collaborate in groups of three to four to complete real-world activity labs that involve collecting data using calculator-based probes and sensors and analyzing the generated data to determine whether their original hypothesis was confirmed.

**Specific features provided:** Gaming technology, Simulation technology, Intelligent tutoring (adaptive tutorial system), Pedagogical agents, Digital notebook (online notes or resource depository/organizer), Interactive whiteboard, Embedded formative assessments, Embedded summative assessments, Options for students to ask for hints, definitions, alternative presentation features, Student materials in print/physical materials/instruments, Teacher customizable assessment system, Dashboard providing teacher with learning data for each student and whole class, Specific guidance for teachers on to how to integrate the technology with their instruction. (Source: PI Survey 2013)

**Project implementation:** August 20, 2012 - May 30, 2013

**No-cost extension:** Yes. Grant period extended to June 30, 2013.

### Wave II Implementation Activity

(Source: SRI data collection - Teacher survey and PI survey)

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Proposal</th>
<th>Projected*</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Districts</td>
<td>16</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>Schools</td>
<td>22</td>
<td>25</td>
<td>19</td>
</tr>
<tr>
<td>Teachers</td>
<td>22</td>
<td>25</td>
<td>19</td>
</tr>
<tr>
<td>Students</td>
<td>500</td>
<td>350</td>
<td>350</td>
</tr>
</tbody>
</table>

*Projected figures are from the Implementation Schedule report October 2011.

**Did project meet target student numbers?**

150

**Instructional time**

<table>
<thead>
<tr>
<th></th>
<th>PI reported*</th>
<th>Teacher reported**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average during school (minutes)</td>
<td>60</td>
<td>66.36</td>
</tr>
<tr>
<td>Average outside of school (minutes)</td>
<td>0</td>
<td>18.18</td>
</tr>
<tr>
<td>Average number of weeks used</td>
<td>30</td>
<td>34.73</td>
</tr>
<tr>
<td>Total average instructional time (hrs)</td>
<td>203.57</td>
<td></td>
</tr>
</tbody>
</table>

*Collected from user statistics and PI survey in Spring 2013
**Collected from teacher survey in 2013. 3 teachers’ responses are out of range and are not included (n = 11).

<table>
<thead>
<tr>
<th>Did usage meet PI expectation?</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher usage</td>
<td>As expected</td>
</tr>
<tr>
<td>Student usage</td>
<td>As expected</td>
</tr>
</tbody>
</table>

**LVS Online Algebra I Final Report**

(Source: EDUCAUSE data collection)

**Research design**

- Comparison with state level achievement as measured by:
  - LEAP (Louisiana Educational Assessment Program) 8th grade math
  - Louisiana State Assessment: end of course testing

**Specific student findings using NWEA MAP**

- Effect size on average, showed no difference compared to VCG Additional findings
  - LVS showed better performance than state level achievement in both LEAP 8th grade math and Louisiana State Assessment (end of course testing). No significant test result was reported.
  - 96% of grade 8 students who completed the Online Algebra I course successfully completed it with a grade of A, B, or C.

**Specific teacher findings:** None reported.

**Greatest barrier**

- Having run the iPad Pilot program for less than one year.
- Not having the newly developed interactive activities available for the students at the beginning of the year.
- Staffing changes within local schools and school districts.
- The closure of the Louisiana Virtual School Program by the Louisiana Department of Education on June 30, 2013.

**Future plans for scaling**

- The Online Algebra I modules and interactive activities will be made accessible to all Louisiana teachers.
- The Louisiana Department of Education is extending the use of NGLC funded Khan Academy digital learning content and curriculum to include entire Algebra and Geometry courses.
**SRI Teacher Survey Summary**

*(N = 14)*: Of the 14 respondents, 86% are classroom teachers, while 14% are computer lab instructors or specialists.

### Student gains

**For the areas targeted by **Online Algebra I**, how would you compare student gains as a result of using **Online Algebra I** to expected gains in a traditional class without it?**

<table>
<thead>
<tr>
<th>Compare to traditional class</th>
<th>Percent of teachers agreeing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significantly more with it</td>
<td>0%</td>
</tr>
<tr>
<td>Somewhat more with it</td>
<td>10%</td>
</tr>
<tr>
<td>About the same with it</td>
<td>20%</td>
</tr>
<tr>
<td>Somewhat less with it</td>
<td>30%</td>
</tr>
<tr>
<td>Significantly less with it</td>
<td>40%</td>
</tr>
</tbody>
</table>

### Student needs and engagement

**Percent of teachers agreeing with the statement**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Percent of teachers agreeing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students enjoy using it.</td>
<td>0%</td>
</tr>
<tr>
<td>Students are highly engaged while using it.</td>
<td>20%</td>
</tr>
<tr>
<td>Students have sufficient time to use it.</td>
<td>40%</td>
</tr>
<tr>
<td>It meets the learning needs of my students.</td>
<td>60%</td>
</tr>
</tbody>
</table>

### Training

100% of the teachers participated in some aspect of the training. Some teachers (28.57%) got from 40 hours or more, and some teachers (28.57%) got between 3-9 hours of training.

### Value of training

**Teachers’ rating of the training**

<table>
<thead>
<tr>
<th>Value</th>
<th>Percent of teachers agreeing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely valuable</td>
<td>0%</td>
</tr>
<tr>
<td>Very valuable</td>
<td>20%</td>
</tr>
<tr>
<td>Moderately valuable</td>
<td>40%</td>
</tr>
<tr>
<td>Slightly valuable</td>
<td>60%</td>
</tr>
<tr>
<td>Not at all valuable</td>
<td>80%</td>
</tr>
</tbody>
</table>

### Selected Teacher Comments

**Impact**

“The biggest impact is their self confidence! They have not learned how to read a math textbook because they have been taught with a "stand and deliver" method in the past. By the end of the year, they are reading the text, studying examples and getting true understanding from it. Now they are confident in their ability to learn math!”

**Recommendation**

“I think that the materials presented are excellent as well as the instruction. Varied activities and Internet based activities are excellent.

“I would recommend it for students that are more independent with their learning. It allows students a chance to move at their own pace with their learning. As a teacher, I would clarify and help students with questions they were having, but they were responsible for the main part of their learning.”

**Challenges**

“Negative impact. Students are not very motivated to do this work.”

“The LVS Algebra I program was good for some students, but not for others. It all depended on their work ethic and study habits. I have used this program for about 4-5 years. Each year was totally different depending on the students. Those who had good work ethics did wonderful.”
Grantee Organization Name: LearnZillion

Title: LearnZillion (formerly The Learning Match)

Targeted subjects: Mathematics

Targeted Common Core: Math and/or ELA

Project description: LearnZillion is a learning platform that delivers video lessons coupled with assessments and progress reporting. Each video lesson addresses math Common Core Standards and was developed by an expert teacher (Dream Team) and reviewed by a teacher panel. The video lessons can be grouped to create individualized student playlists to support personalized teaching and learning. Teachers can also use the video lessons to review content and learn more about instructional best practices. Additional content areas covered by the LearnZillion platform were not evaluated under the Wave II grant.

Specific features provided: Pedagogical agents, Embedded formative assessments, Embedded summative assessments, Student materials in print/physical materials/instruments, Dashboard providing teacher with learning data for each student and whole class

(source: PI Survey)

Project implementation: September 2011 - December 2012 (project resources continue to be used currently)

No-cost extension: Yes. Grant period was extended to February 28, 2013.

Wave II Implementation Activity

(Source: SRI data collection - Teacher survey and PI survey)

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Proposal*</th>
<th>Projected**</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Districts</td>
<td>15</td>
<td>16+</td>
<td>NR</td>
</tr>
<tr>
<td>Schools</td>
<td>15</td>
<td>276</td>
<td>NR</td>
</tr>
<tr>
<td>Teachers</td>
<td>100</td>
<td>276+</td>
<td>250,000***</td>
</tr>
<tr>
<td>Students</td>
<td>2000</td>
<td>NR</td>
<td>260,000***</td>
</tr>
</tbody>
</table>

*Proposal figures represent pilot testing goals.
**Projected figures are from the site visit debrief report Dec 2011.
*** Figures represent users registered on the site, but not necessarily regular users.
1 NR = not reported

Did project meet target student numbers? N/A

Administered NWEA MAP assessment
Included in Wave 2 meta-analysis

Instructional time

<table>
<thead>
<tr>
<th>PI reported*</th>
<th>Teacher reported**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average during school (minutes)</td>
<td>20</td>
</tr>
<tr>
<td>Average outside of school (minutes)</td>
<td>20</td>
</tr>
<tr>
<td>Average number of weeks used</td>
<td>NR1</td>
</tr>
<tr>
<td>Total average instructional time (hrs)</td>
<td>30.24</td>
</tr>
</tbody>
</table>

*Collected from PI survey in 2013
** Collected from teacher survey in 2013. One teacher's response is out of range, so it is not included (n = 15).
1 NR = not reported

Did usage meet PI expectation?

Teacher usage: As expected
Student usage: As expected

LearnZillion Final Report

(Source: EDUCAUSE data collection)

Research design
• Pre/post-test with 6 weeks of instruction between events (treatment students only)

Specific student findings
• Not reported in the final report

Specific teacher findings
• Conducted a survey with Dream Team teachers (N = 160) - expect to publish results in about 9 months.

Greatest barrier
• Challenges in partnering with specific networks, schools, or teachers.
• Not able to track the effectiveness of each lesson or the impact of the lessons on student learning at current scale.

Future plans for scaling
• Build a community of teachers dedicated to high quality instruction.
• Develop a Common Core digital curriculum that is flexible, customizable, and responsive to student learning.
• Support a new form of professional development.
SRI Teacher Survey Summary
(N = 16): Of the 16 respondents, 100% are classroom teachers.

Student gains
For the areas targeted by LearnZillion, how would you compare student gains as a result of using LearnZillion to expected gains in a traditional class without it?

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Significantly more with it</th>
<th>Somewhat more with it</th>
<th>About the same with it</th>
<th>Somewhat less with it</th>
<th>Significantly less with it</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>10%</td>
<td>20%</td>
<td>30%</td>
<td>40%</td>
<td>50%</td>
</tr>
</tbody>
</table>

Student needs and engagement
Percent of teachers agreeing with the statement

<table>
<thead>
<tr>
<th>Statement</th>
<th>0%</th>
<th>20%</th>
<th>40%</th>
<th>60%</th>
<th>80%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students enjoy using it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>80%</td>
</tr>
<tr>
<td>Students are highly engaged while using it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>60%</td>
</tr>
<tr>
<td>Students have sufficient time to use it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td>It meets the learning needs of my students.</td>
<td></td>
<td></td>
<td></td>
<td>80%</td>
<td>60%</td>
<td>40%</td>
</tr>
</tbody>
</table>

Training
6% of the teachers surveyed participated in some aspect of the training. The time they spent in training was 2 hours or less.

Value of training
All teachers who received the training and participated in the survey rated the training to be very valuable.

Selected Teacher Comments

Impact
“Students are able to use the information in the lessons to review on their own with narration at home. The notes page also helps them organize the information in ways that make sense to them and better understand the material.”

“The ability for my students to access LearnZillion on their own at home or at school had the greatest impact. Students could revisit lessons for reteaching and review. I found that my students were evaluating their work and choosing to go back to LearnZillion.”

Recommendation
“It is a great first step to differentiating instruction for students and can lead the way to a blended classroom. It can free up time to work with individual small groups of students while keeping other students engaged with learning. It can require some significant professional development to use technology with students, but I think the end result is worth it.”

“I would recommend LearnZillion to other teachers as an additional instructional resource to use when planning lessons. Videos are generally easy to understand and practice problems are provided for students.”

Challenges
“*I didn’t know the data <teacher dashboard> existed*”
Grantee Organization Name: Texas Tech University / APS4Math

Title: Adaptive Problem Solving for Mathematics: Assessing and Adapting to Students While They Are Learning

POC or ESA

Targeted subjects: Mathematics

Targeted Common Core: Math and/or ELA

Project description: APS4Math is an adaptive Web-based series of tutorials that support students’ mathematics problem solving (modeling) skills. The tutorial modules provide continuous integration of assessment and teaching components. While students solve problems, an intelligent, adaptive tutor monitors their knowledge and skills to provide feedback in the form of scaffolds. Students who need more assistance in improving problem solving skills receive extra help and guidance, whereas those who have reached higher proficiency are provided with less guidance and more practice with problem solving tasks. APS4Math decomposes the problem solving process into smaller, more manageable steps.

Specific features provided: Intelligent tutoring (adaptive tutorial system); Embedded formative assessments; Embedded summative assessments; Teacher customizable assessment system; Dashboard providing teacher with learning data for each student and whole class; Specific guidance for teachers on how to integrate the technology with their instruction. (source: PI Survey)

Project implementation: April 2012 - May 2012

No-cost extension: Yes. Grant period was extended to February 28, 2013.

Wave II Implementation Activity
(Source: SRI data collection - Teacher survey and PI survey)

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Proposal</th>
<th>Projected*</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Districts</strong></td>
<td>NR1</td>
<td>NR</td>
<td>3</td>
</tr>
<tr>
<td><strong>Schools</strong></td>
<td>NR</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>Teachers</strong></td>
<td>6</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>Students</strong></td>
<td>250</td>
<td>250</td>
<td>262</td>
</tr>
</tbody>
</table>

*Projected figures are from the Project Milestone report Jan 2012. 1 NR = not reported

Did project meet target student numbers? +12

Administered NWEA MAP assessment ☑
Included in Wave 2 meta-analysis ☑

Instructional time

<table>
<thead>
<tr>
<th></th>
<th>PI reported*</th>
<th>Teacher reported**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average during school (minutes)</td>
<td>40</td>
<td>45</td>
</tr>
<tr>
<td>Average outside of school (minutes)</td>
<td>0</td>
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<tr>
<td>Average number of weeks used</td>
<td>3.4</td>
<td>2</td>
</tr>
<tr>
<td>Total average instructional time (hrs)</td>
<td>3.25</td>
<td></td>
</tr>
</tbody>
</table>

*Collected from PI survey in 2012
**Collected from teacher survey in 2012

Did usage meet PI expectation?

Teacher usage As expected
Student usage As expected

APS4Math Final Report
(Source: EDUCAUSE data collection)

Research design
• Pre- and post knowledge test
• Classroom observations
• Student attitudes questionnaire
• Teacher interviews
• NWEA MAP administration with participating classrooms, but did not administer posttest

Specific student findings using project developed assessment
• APS4Math significantly improved student math problem solving skills when it was implemented to support curriculum objectives
• Students who struggled with problem solving showed the highest improvement

Sample of comments gathered through student attitudes questionnaire (provided by grantee)
• “It challenged me. As I got them right it moved me up to harder questions”
• “It showed how each problem should be worked out so that way people can understand it better”
• “It was easy to follow through”
• “It helped me understand what I needed to learn”
• “I enjoyed the layout and the questions did challenge me and I enjoy being challenged”
• “It helped me step by step to get through an equation that I couldn’t figure out”
Specific teacher findings:

Participating teachers liked the tutorial and requested to use the tutorial in subsequent semesters and for additional courses. Reasons teachers gave for their appreciation for the APS4math tutorial include:

- The tutorial accommodates students with different profiles, prior experience, and problem solving abilities.
- The tutorial content is well aligned with Texas state standards.
- The questions and practice items comparably reflected the expectation of state tests.
- The tutorial allowed teachers to monitor student progress so they could identify struggling students and coach them individually.
- The tutorial provided teachers multiple implementation options such as one-to-one tutoring, homework, and for content reviews.

Qualitative findings from teacher interviews (provided by grantee)

- The tutorial is well aligned with state curriculum standards and the questions were rigorous and high level.
- Teachers felt that the tutorial better fit their needs than other commercially developed tutorials.
- The tutorial allowed students to study at their own pace while the difficulty of the questions and support was adapted based on their progress.
- Through real time reporting, teachers monitored student progress and identified which student needs more help allowing them to target those who struggle the most.
- Teachers were able to differentiate instruction (e.g. small group sessions, whole class clarification) based on student tutorial performance.
- Teachers asserted that the support provided by the tutorial helped students better understand the problem solving process and how to approach algebra problems.

Greatest barrier

- Technical infrastructure of each school impacted implementation due to the availability of computers for student use.
- School commitments to other projects overlapped with the APS4Math implementation, limiting the amount of time teachers could commit to the project.
- Recruitment was especially difficult. Texas did not adopt CCSS, so schools had less incentive to participate in a project working toward CCSS alignment. This also impacted data collection efforts as teachers had little motivation to administer the MAP post-test.

Future plans for scaling

- Extend the project and implementation with other schools from the region.
- Have submitted two research grant proposals to NSF to scale up this project.

Considerations:

The APS4Math team specifically recruited "high-needs" schools, that is schools with:

- Low student performance
- 70%+ free & reduced lunch (low SES)
- 70%+ Hispanic/Latino population (high ELL population)

This came with consequences:

- High transitory student population
- High teacher turnover
- Most schools lacked the technology infrastructure to support access to computers that can utilize interactive software

SRI Teacher Survey Summary

\(N = 2\): The two participants are both classroom teachers.

We are not able to present any further results in this area because the number of respondents was less than 5.
**Grantee Organization Name:** iCivics / Drafting Board

**Title:** iCivics: Drafting Board

**Targeted subjects:** Civics, English/Writing/Language Arts, Social Science/History

**Targeted Common Core:** Math □ and/or ELA □

**Project description:** Drafting Board is a game-centered curriculum that provides middle and high school students with resources for becoming active and informed citizens. The games place students in different civics roles to address real-world issues. Learning objectives are integrated with lesson plans and other resources aligned to state and Common Core Standards. Drafting Board modules teach students to research and write arguments about key civics topics. Drafting Board also provides educators with a modular, and Common Core-aligned set of resources to teach argumentation.

**Specific features provided:** Simulation technology; Pedagogical agents; Embedded formative assessments; Options for students to ask for hints, definitions, alternative presentation features; Dashboard providing teacher with learning data for each student and whole class; Specific guidance for teachers on how to integrate the technology with their instruction. (Source: PI Survey)

**Project implementation:** April 2012 - May 2012

**No-cost extension:** No. Grant period ended September 30, 2012.

### Wave II Implementation Activity
(Source: SRI data collection - Teacher survey and PI survey)

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Proposed</th>
<th>Projected*</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Districts</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Schools</td>
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<td>NR</td>
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<td>Teachers</td>
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<td>Students</td>
<td>1200</td>
<td>NR</td>
<td>2079</td>
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</table>

*Projected figures are from the Project Milestone report Jan 2012. The total evaluation group was much larger, 3,725 students including those students in the comparison group.

1 NR = not reported

<table>
<thead>
<tr>
<th>Instructional time</th>
<th>PI reported*</th>
<th>Teacher reported*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average during school (minutes)</td>
<td>40</td>
<td>46.3</td>
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<tr>
<td>Average outside of school (minutes)</td>
<td>30</td>
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<tr>
<td>Average number of weeks used</td>
<td>1.9</td>
<td>3.0</td>
</tr>
<tr>
<td>Total average instructional time (hrs)</td>
<td>6.7</td>
<td></td>
</tr>
</tbody>
</table>

*Collected from PI survey in 2012
**Collected from teacher survey in 2012. One teacher's response is out of range, so it is not included (n = 4).

<table>
<thead>
<tr>
<th>Did project meet target student numbers?</th>
<th>879</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administered NWEA MAP assessment</td>
<td>□</td>
</tr>
<tr>
<td>Included in Wave 2 meta-analysis</td>
<td>☑</td>
</tr>
</tbody>
</table>

**Research design**
- Randomized clustered-design experiment

**Specific student findings as measured by CA Star writing prompt**
- Drafting Board students on average, showed statistically significant better performance on their essays compared to the comparison students, even after controlling for demographic information.

**Additional findings**
- Students who felt highly engaged with Drafting Board were 50% more likely to write "excellent" essays (i.e., scoring four out of four) than those who felt less engaged.
- Female students and experimental group were more likely to score 3 and above (out of 4).

**Specific teacher findings:** None reported.

**Greatest barrier**
- HTML5 presented unexpected design challenges and limited some of the complex interactivity that iCivics games often have.
- Experienced technical difficulties with browser compatibility and computer lab access.
- Had difficulty securing demographic data from Hillsborough and Orange County school districts.

**Future plans for scaling**
- Since close of grant period, iCivics has conducted teacher focus groups to iterate on an improved version of Drafting Board.
- iCivics is working with BrainPOP to integrate Drafting Board on the GameUp platform.
- National Archives and EverFi have expressed strong interest in partnering with iCivics.
• Many of the teachers in the Drafting Board evaluation did not properly administer the intervention. Most teachers left students to complete Drafting Board at their own self-directed pace.

SRI Teacher Survey Summary
(N = 5): Of the 5 respondents, 100% are classroom teachers.

Student gains
For the areas targeted by iCivics Drafting Board, how would you compare student gains as a result of using iCivics Drafting Board to expected gains in a traditional class without it?

Student needs and engagement
Percent of teachers agreeing with the statement

Training
100% of the teachers participated in some aspect of the training. All of them (100%) got between 3-9 hours of training.

Value of training

Teachers’ rating of the training

Impact
“Helping the students see the need for examples and evidence to support and argument <sic> or position on a topic.”

“My students enjoyed being able to work on the computer to complete an assignment for my class. They were engaged everytime <sic> we went to work on the project. Many found the related topic very interesting to learn about.”

Recommendation
“Student engagement, rigor, clear learning goals, tied to the curriculum in Civics and Language Arts.”

“It is an alternative to students being in the classroom working on assignments. It is engaging technology wise and it also provides students an alternative to their English classroom essay writing.”

Challenges
“Insufficient amount of computers.”

“Most students enjoyed working with the writing because it gave them a new way to write with computer assistance, however others felt it was an easy way to click through and not put in the required effort.”
Grantee Organization Name: Imagine Education / Ko’s Journey

Title: Ko’s Journey

Targeted subjects: Mathematics

Targeted Common Core: Math ☑ and/or ELA ☐

Project description: Ko’s Journey is a math game embedded in a narrative adventure. It provides 3D animations together with direct manipulation of objects to give students an immersive experience, where solving the math problem is part of reaching goals within the story. It also has additional "bridging" videos that help the student understand how the math problems in the story are related to problems they may encounter on a standard math test.

Specific features provided: Gaming technology; Simulation technology; Pedagogical agents; Embedded formative assessments; Embedded summative assessments; Dashboard providing teacher with learning data for each student and whole class; Specific guidance for teachers on to how to integrate the technology with their instruction. (Source: PI Survey)

Project implementation: February 2011 - May 2012


Wave II Implementation Activity
(Source: SRI data collection - Teacher survey and PI survey)

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Proposal</th>
<th>Projected*</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Districts</strong></td>
<td>NR¹</td>
<td>NR</td>
<td>8</td>
</tr>
<tr>
<td><strong>Schools</strong></td>
<td>(+ 1 virtual)</td>
<td>(+ 1 virtual)</td>
<td>10 (including 1 virtual school)</td>
</tr>
<tr>
<td><strong>Teachers</strong></td>
<td>(20 classes)</td>
<td>(20 classes)</td>
<td>17 (24 classes)</td>
</tr>
<tr>
<td><strong>Students</strong></td>
<td>600</td>
<td>NR</td>
<td>734</td>
</tr>
</tbody>
</table>

*Projected figures are from the Project Milestone report Jan 2012.
¹ NR = not reported

- Did project meet target student numbers? 134
- Administered NWEA MAP assessment
- Included in Wave 2 meta-analysis

Instructional time

<table>
<thead>
<tr>
<th>PI reported*</th>
<th>Teacher reported**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average during school (minutes)</td>
<td>50</td>
</tr>
<tr>
<td>Average outside of school (minutes)</td>
<td>20</td>
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<tr>
<td>Average number of weeks used</td>
<td>12</td>
</tr>
<tr>
<td>Total average instructional time (hrs)</td>
<td>28.5</td>
</tr>
</tbody>
</table>

*Collected from PI survey in 2012
** Collected from teacher survey in 2012

Ko’s Journey - Final Report
(Source: EDUCAUSE data collection)

Research design
- Experimental Design

Specific student findings (As measured by project created pre- and post-test).
- Students in the control condition who score low on the pretest score higher on the post-test than students in the experimental condition who score low on the pre-test.
- Students in the experimental condition who score high on the pre-test score better than students in the control condition that also scored high on the pre-test.
- Effect size on average, showed no difference between Ko’s Journey and comparison students

Specific teacher findings: None reported.

Greatest barrier
- Full pricing models lead to slower adoption.
- Not all schools were equipped with the necessary bandwidth and machine specification for Ko’s Journey.
- It took longer than expected to obtain external data from districts.

Future plans for scaling
- Received a SBIR Phase I grant for the first-socially-networked math game called Empires.
- Plan to develop of a full year curriculum that begins with Ko’s Journey and ends with Empires.
SRI Teacher Survey Summary \( (N = 18) \):

Of the 18 respondents, 88.89% are classroom teachers, while 5.56% are Internet-school teachers, and 5.56% are online teachers.

Student gains

For the areas targeted by Ko's Journey, how would you compare student gains as a result of using Ko's Journey to expected gains in a traditional class without it?

- significantly more with it
- somewhat more with it
- about the same with it
- somewhat less with it
- significantly less with it

Student needs and engagement

Percent of teachers agreeing with the statement:

- Students enjoy using it.
- Students are highly engaged while using it.
- Students have sufficient time to use it.
- It meets the learning needs of my students.

Training

94.44% of the teachers participated in some aspect of the training. 47.06% got from 20-39 hours, and 29.41% got between 3-9 hours of training.

Value of training

Teachers' rating of the training

- extremely valuable
- very valuable
- moderately valuable
- slightly valuable
- Not at all valuable

Impact

"The students really enjoyed the math correlation to a real life situation, and the students did not feel the pressure of being unsuccessful. All of the students worked together as a team, and truly became a classroom environment where students were comfortable with asking others, their peers, for help. Also, the students became teachers to others and further developed the concepts of internalizing math concepts by having to teach them to others."

"Ko's Journey gave clear focus to the scope of my students' learning outcomes this school year. That and it helped students to have a clear challenge to accomplish in math class. This improved student attitudes and motivation for working on the skills they needed for completing the game."

Recommendation

"I think that Ko's is ideal for positive behavior support as it can be used as an incentive. Additionally, Ko's offers a range of Math standards that teachers can use. One suggestion though is to give teachers the opportunity to move levels around, that way they can align it with their unit or lesson plans better."

"I would recommend Ko's to teachers as a drop in unit to be completed in a few weeks time. I think the content is not in line with the new common core for middle school. I'm not certain about this. It is a good program for application and problem solving, as long as students already have an understanding of the underlying skills necessary for success. The thing I like most is the idea of giving students a new and exciting way of applying what they are learning about math."

Challenges

"Ko's had a great many issues and many students stopped the class because of it."

"It slowed their progress in the course due to technical issues and had to do more tutoring on backgrounds skills in order to understand what the student was suppose to accomplish in the game."
Grantee Organization Name: Massachusetts Institute of Technology / Lure of the Labyrinth

Title: The Lure of the Labyrinth Challenge: A national competition for 7th and 8th grade math students

POC □ or ESA □

Targeted subjects: Mathematics

Targeted Common Core: Math □ and/or ELA □

Project description: The Lure of Labyrinth is a web-based game for middle-school pre-algebra students. Each game-level has puzzles that engage students in mathematical thinking. Students can work in teams to solve the puzzles. By using the “Administrator” tool set they can review individual student progress.

Specific features provided: Gaming technology; Student-to-student social media; Student(s)-to-teacher social media; Dashboard providing teacher with learning data for each student and whole class. (source: PI Survey)

Project implementation: April 2012 - June 2012

No-cost extension: Yes. December, 31 2012

Wave II Implementation Activity
(Source: SRI data collection - Teacher survey and PI survey)

Did project meet target student numbers? NA
PI note: “Note that this figure only includes students who were signed up by a teacher, as those are the only students our IRB will allow us to report on. Furthermore, this also only includes students who logged in to a puzzle room, to avoid including dummy/unwanted accounts.”

Administered NWEA MAP assessment □
Included in Wave 2 meta-analysis □

Research design
• Pre/post teacher survey
• Qualitative analysis of message board posts
• Interview with teachers of top-performing teams
• User statistics: Game play data

Specific student findings
• Though most posts on the message boards were not related to the game, high quality message board posts were associated with high success in the math puzzles.
• Students put in the most effort on puzzles that were the most difficult within a given level.
• When presented with a puzzle of minimal difficulty, students were able to make consistent progress as they made repeated attempts. However, as puzzle difficulty increased, students’ performance over time tended to plateau or decrease.

Specific teacher findings
• Very few teachers used the message boards.
• When teachers used the message boards, it was typically to keep students on task.
• More likely key to success is having teachers who are enthusiastic about the game and willing to use it as an opportunity for learning and collaboration with their students.

Greatest barrier
• Not feasible to collect MAP data

Future plans for scaling
• The Labyrinth Challenge has already provided
SRI Teacher Survey Summary

(N = 41): Of the 41 respondents, 63.4% are classroom teachers, 19.5% are computer lab instructors or specialists, 12.2% are special service providers, and 4.9% are math club coaches.

Student gains

For the areas targeted by *Lure of the Labyrinth*, how would you compare student gains as a result of using *Lure of the Labyrinth* to expected gains in a traditional class without it?

- significantly more with it
- somewhat more with it
- about the same with it
- somewhat less with it

Students need and engagement

Percent of teachers agreeing with the statement

- Students enjoy using it.
- Students are highly engaged while using it.
- Students have sufficient time to use it.
- It meets the learning needs of my students.

Training

4.88% of the teachers reported participating in some aspect of training. The PI reports that no training was offered. Teacher survey respondents indicated that they played the game and they searched the website as noted in this quote: “It was hard to figure out. I did find the Educators section of the website most helpful. Although navigating through all the different sections was difficult. When I had questions I emailed the contact person or email address posted on website. Unfortunately, responses were not always timely.”

Value of training

Ninety-five percent of respondents indicated that the question was not applicable. <Sparse teacher online help was provided>

Selected Teacher Comments

Impact

“Because the game included a strong incentive, students engaged in a lot of cooperative work when playing the game. While I encourage this in class, some students are reluctant to engage this way (some are hesitant to admit that they don’t understand something and some see working with someone else as just slowing them down). With such a big incentive (the competition), every student engaged in cooperative work. There was a lot of mathematical discourse.”

“Some of my students were very engaged in solving the problems. They enjoyed the challenge and did not think about it as “learning”. Here is a comment and response between 2 of my students (response top, 1st comment bottom): ‘Team1 General, I know! It’s fun and challenging! :D’ ‘Team1NCC General, The math is so cleverly placed in the games! How great is that-students having fun while doing math!”

“I have had great difficulty getting my students to work together on anything all year. I had given up on all lessons that involved group work/participation. But, the Labyrinth challenge, which involves video games, and graphic novels (both of which my students are really, really interested in) they worked amazingly well together. They were engaged the entire time, they asked each other questions, they strived to get the right answers and to learn the material so that they could pass on to the next task. I even had students participating in the Labyrinth challenge during recess!”

Recommendation

“This challenge was highly engaging, collaborate, and challenging for my students. My students are an identified group in need of a challenge. Many of them become <sic> bored in their regular classes, and this challenge is a great option for the students when they are finished their classwork. I cannot say enough about how much my class enjoyed this challenge.”

“To increase student motivation and involvement in the problem solving process. To model collaborative problem solving. To increase higher order thinking skills.”

Challenges

“The only other suggestion I would make is to make the intro shorter. Students only have so much time in class and we had to spend too much time getting past the intro before actual “math” could take place. Otherwise, a GREAT program.”

“I truly did not realize I could access this information AND I was using it strictly for in class observation of student interaction and problem solving skills.”

“In our school, computer access and reliability is a challenge, and our internet can be slow and glitchy when many students are accessing the program simultaneously.”
**Grantee Organization Name:** North Carolina State University / Crystal Island

**Title:** Promoting Literacy Education in Rural Schools with Intelligent Game-Based Learning Environments: Crystal Island Outbreak

**Targeted subjects:** English/Writing/Language Arts, General Science

**Targeted Common Core:** Math and/or ELA

**Project description:** Crystal Island Outbreak is an intelligent game-based learning environment developed for middle grade students. Students interact with Crystal Island to solve a science mystery as they learn about microbiology.

**Specific features provided:** Gaming technology; Pedagogical agents; Embedded formative assessments; Options for students to ask for hints, definitions, alternative presentation features; Specific guidance for teachers on how to integrate the technology with their instruction. (Source: PI Survey)

**Project implementation:** March 2012 - May 2012

**No-cost extension:** No. Grant period ended September 30, 2012.

### Wave 2 Implementation Activity
(Source: SRI data collection - Teacher survey and PI survey)

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Proposal</th>
<th>Projected*</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Districts</td>
<td>NR1</td>
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<td>2</td>
</tr>
<tr>
<td>Schools (60 classes)</td>
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<td></td>
</tr>
<tr>
<td>Teachers</td>
<td>NR</td>
<td>NR</td>
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</tr>
<tr>
<td>Students</td>
<td>1000</td>
<td>2656</td>
<td>1254</td>
</tr>
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*Projected figures are from the Implementation Schedule report Jan 2012.
1 NR = not reported

<table>
<thead>
<tr>
<th>Instructional time</th>
<th>PI reported*</th>
<th>Teacher reported**</th>
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<tbody>
<tr>
<td>Average during school (minutes)</td>
<td>45</td>
<td>54.00</td>
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<tr>
<td>Average outside of school (minutes)</td>
<td>0</td>
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<tr>
<td>Average number of weeks used</td>
<td>5.1</td>
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</tr>
<tr>
<td>Total average instructional time (hrs)</td>
<td>13.12</td>
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*Collected from PI survey in 2012
** Collected from teacher survey in 2012. Two teachers’ responses are out of range, so they are not included (n=29).

<table>
<thead>
<tr>
<th>Did project meet target student numbers?</th>
<th>254</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administered NWEA MAP assessment</td>
<td>✓</td>
</tr>
<tr>
<td>Included in Wave 2 meta-analysis</td>
<td>✓</td>
</tr>
</tbody>
</table>

### Crystal Island Final Report
(Source: EDUCAUSE data collection)

**Research design**
- Project created online pre-post assessment
- Implicit Motivation Inventory
- Effect size using NWEA MAP on average, showed less growth compared to ANG

**Specific student findings as measured by project created online pre-post assessment**
- There was a significant increase in both the science content test scores and reading skill scores after the Crystal Island experience (p < .05).
- Science content knowledge gains and reading skill acquisition did not differ based on hours per week spent playing computer games, subjective frequency of playing video games, nor self-reported game play abilities.

**Specific student findings as measured by Implicit Motivation Inventory**
- Overall girls had greater motivation to read both before and after the Crystal Island experience. Girls also reported putting greater effort into Crystal Island than boys (p < .05).
- Boys perceived themselves to have greater competence at playing Crystal Island (p<.05).

**Specific student findings as measured by user statistics**
- Girls played longer, succeeded on more concept matrices, and solved more concept matrices in their first attempts (p < .05).

**Specific teacher findings:** None reported.

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<table>
<thead>
<tr>
<th>Greatest barrier</th>
<th>Future plans for scaling</th>
</tr>
</thead>
<tbody>
<tr>
<td>No major barrier</td>
<td>Crystal Island’s scaling-up model will combine bridge support from foundations and granting agencies with financial support from school systems.</td>
</tr>
</tbody>
</table>

- **The team plans to deploy Crystal Island nationally.**
SRI Teacher Survey Summary

(N = 31): Of the 31 respondents, 54.8% are classroom teachers, 32.3% are computer lab instructors or specialists, and 12.9% are special service providers.

Student gains

For the areas targeted by Crystal Island, how would you compare student gains as a result of using Crystal Island to expected gains in a traditional class without it?

<table>
<thead>
<tr>
<th></th>
<th>0%</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
<th>70%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significantly more with it</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Somewhat more with it</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>About the same with it</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Somewhat less with it</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Significantly less with it</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Student needs and engagement

Percent of teachers agreeing with the statement

<table>
<thead>
<tr>
<th></th>
<th>0%</th>
<th>20%</th>
<th>40%</th>
<th>60%</th>
<th>80%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students enjoy using it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students are highly engaged while using it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students have sufficient time to use it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It meets the learning needs of my students.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Training

100% of the teachers surveyed participated in some aspect of the training. Most teachers (54.84%) got from 10-19 hours, and some teachers (29.03%) got between 3-9 hours of training.

Value of training

Teachers’ rating of the training

<table>
<thead>
<tr>
<th></th>
<th>0%</th>
<th>5%</th>
<th>10%</th>
<th>15%</th>
<th>20%</th>
<th>25%</th>
<th>30%</th>
<th>35%</th>
<th>40%</th>
<th>45%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely valuable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very valuable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderately valuable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slightly valuable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at all valuable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Selected Teacher Comments

Impact

“The ‘at risk’ student really were the stars of the class during the time Crystal Island was implemented. They were so into the ‘gaming’ of the program they didn’t realize they were learning. They were also able to help other students that were not ‘gamers.’”

“Students learned to use the graphic organizer (the GOTs charts) and to break down informational text. The virtual game engaged some students who otherwise would not have gotten involved.”

“The greatest impact for me was the opportunity to get to know my students’ personalities, character, and work habits by observing how they interacted with the game. I would say it was a good community-building activity for the class to be working through together (even though they were working individually on the computer).”

Recommendation

“Crystal Island: Lost Investigation is an engaging, highly motivating teaching tool that crosses the curriculum to teach critical thinking skills within core-content subject matter. In addition, it increases student responsibility for learning, making it a valuable component to assist in changing a classroom to fit today’s teaching philosophies <sic>.”

“I feel Crystal Island did a great job integrating the Common Core standards in ELA and with our new Science curriculum. This group of kids are gamers and when they can learn playing interactive games, it’s a win-win situation. My students didn’t even realize how much they learned about Microbiology until they begin studying that content in their science class.”

Challenges

“Computer access at my school and computers that did not run the program well -- we really should have Apples or more up-to-date PCs than we do. Our mini-laptops did not work well with the game.”
**Grantee Organization Name:** SMALLab Learning, Inc.

**Title:** Simple Machines: *Embodied Interactive Whiteboard*  
**POC** □ or **ESA** ✗

**Targeted subjects:** Mathematics, English Language Arts, Science  
**Targeted Common Core:** Math ✗ and/or ELA ✗

**Project description:** The *Embodied Interactive Whiteboard* project provided middle school students with kinesthetic multimodal experiences so that they could “embody” several Common Core math and science concepts via gesture within a game environment. Students learned about simple machines (gears and levers) using gesturally congruent motions that were tracked by a Microsoft KINECT sensor. The modules consisted of a five-game series on mechanical advantage, gear ratios, and the three types of levers while focusing on the Work = Force x Distance equation. Several test measures were created and in-game data were tracked as well.

**Specific features provided:** Intelligent tutoring (adaptive tutorial system), Pedagogical agents, Embedded formative assessments, Embedded summative assessments, Options for students to ask for hints, definitions, alternative presentation features, Teacher customizable assessment system, Dashboard providing teacher with learning data for each student and whole class. *(source: PI Survey 2013)*

**Project implementation:** October 2012 - December 2012  
**No-cost extension:** Yes. Grant period extended to December 31, 2012.

### Wave 2 Implementation Activity
(Source: SRI data collection - Teacher survey and PI survey)

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Proposal</th>
<th>Projected*</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Districts</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Schools</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Teachers</td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Students</td>
<td>200</td>
<td>NR</td>
<td>172</td>
</tr>
</tbody>
</table>

*Projected figures are from the Implementation Schedule report November 2012. Pre-post-test scores for 135 students.  
* NR = not reported

**Instructional time**

<table>
<thead>
<tr>
<th></th>
<th>PI reported*</th>
<th>Teacher reported**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average during school (minutes)</td>
<td>50</td>
<td>75</td>
</tr>
<tr>
<td>Average outside of school (minutes)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Average number of weeks used</td>
<td>2.5</td>
<td>36</td>
</tr>
<tr>
<td>Total average instructional time (hrs)</td>
<td>180</td>
<td></td>
</tr>
</tbody>
</table>

*Collected from PI survey in 2013  
** Collected from teacher survey in 2013. N=1.

**Did project meet target student numbers?** -28

- Administered NWEA MAP assessment □
- Included in Wave 2 meta-analysis ✗

**Did usage meet PI expectation?**

- Teacher usage As expected
- Student usage More than expected

### SMALLab Learning Final Report
(Source: EDUCAUSE data collection)

**Research design**

- Attitudes towards Science Situated with Embodied Technologies pre- and post-test: experimenter-designed test  
- Gears and Levers Middle School Content Knowledge pre-and post-test: experimenter-designed paper and pencil test to assess knowledge changes that apply to understanding gears and levers relationship to the mathematical representation W = F x D.  
- Embedded assessments – no validity/reliability data  
- Recruited schools already administering NWEA MAP assessments  
- Targeted both predominately low SES schools and general population school environments

**Specific student findings as measured by**

- NWEA MAP Science Concepts and Processes and General Science were obtained for one project school effect size on average showed no difference compared to VCG.  
- Project developed assessment finding were not presented in the final report.

**Specific teacher findings**

- One teacher’s data was not used, because students did not use the modules.  
- No other findings available in the final progress report.
<table>
<thead>
<tr>
<th>Greatest barrier</th>
<th>Future plans for scaling</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Going to schools outside of home city for studies, PD suffered because could not spend the time necessary with them to develop both pedagogical foundations and the instructional implementation (stations model – where pairs of students rotate through the games).</td>
<td>• Need to find more funds to scale-up and would like to approach the Gates Foundation.</td>
</tr>
<tr>
<td></td>
<td>• Have been seeking Angel investors in Los Angeles and Phoenix.</td>
</tr>
<tr>
<td></td>
<td>• Seeking ways to disseminate information so that teachers/schools can locate materials.</td>
</tr>
<tr>
<td></td>
<td>• Slated for paper presentation at AERA 2014, <em>How to create sticky embodied content: Designing and assessing with immersive technologies.</em></td>
</tr>
</tbody>
</table>

**SRI Teacher Survey Summary**  
*(N = 1): The one respondent is a special service provider.*  
We are not able to present any further results in this area because the number of respondents was less than 5.
**Grantee Organization Name:** University of Massachusetts / Wayang Outpost

**Title:** Intelligent Digital Mathematics Tutoring for K-12 Students: Wayang Outpost

**Targeted subjects:** Mathematics

**Targeted Common Core:** Math ☑ and/or ELA ☐

**Project description:** *Wayang Outpost* is an intelligent tutoring system that presents math problems to students using multimedia and animated adventures. *Wayang Outpost* provides individualized support through an animated study partner that provides hints and encouragement. Additionally, the intelligent tutor engine accommodates the student’s learning needs by adjusting the level of the problem, providing scaffolded instruction, and progress monitoring.

**Specific features provided:** Gaming technology; Intelligent tutoring (adaptive tutorial system); Pedagogical agents; Interactive whiteboard; Embedded formative assessments; Embedded summative assessments; Options for students to ask for hints, definitions, alternative presentation features; Teacher customizable assessment system; Dashboard providing teacher with learning data for each student and whole class; Specific guidance for teachers on to how to integrate the technology with their instruction. (source: PI Survey)

**Project implementation:** February-June 2012 and February-June 2013

**No-cost extension:** Yes. Project deadline extended to April 30, 2013.

### Wave II Implementation Activity

(Source: SRI data collection - Teacher survey and PI survey)

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Proposed</th>
<th>Projected*</th>
<th>Actual (2012)</th>
<th>Actual (2013)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Districts</td>
<td>6</td>
<td>NR</td>
<td>5**</td>
<td>15</td>
</tr>
<tr>
<td>Schools</td>
<td>6</td>
<td>5</td>
<td>5**</td>
<td>19</td>
</tr>
<tr>
<td>Teachers</td>
<td>NR¹</td>
<td>NR</td>
<td>12**</td>
<td>19</td>
</tr>
<tr>
<td>Students</td>
<td>1570</td>
<td>482</td>
<td>410**</td>
<td>281</td>
</tr>
</tbody>
</table>

*Projected figures are from the Implementation Schedule report Oct 13, 2011. **Girls Inc. afterschool program represents 1 district, 1 school, 3 teachers, and 35 students.¹ NR = not reported

- **Did project meet target student numbers?** -807
  - Administered NWEA MAP assessment ☐
  - Included in Wave 2 meta-analysis ☐

<table>
<thead>
<tr>
<th>Instructional time</th>
<th>PI reported*</th>
<th>Teacher reported**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average during school (minutes)</td>
<td>45</td>
<td>41</td>
</tr>
<tr>
<td>Average outside of school (minutes)</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>Average number of weeks used</td>
<td>19.3</td>
<td>5</td>
</tr>
<tr>
<td>Total average instructional time (hrs)</td>
<td>3.8</td>
<td></td>
</tr>
</tbody>
</table>

*Collected from PI survey in 2012 ** Collected from teacher survey in 2012. 1 teacher’s response is out of range and is not included (n = 6).

Did usage meet PI expectation?

- Teacher usage
  - Less than Expected ☐
  - Expected ☐

- Student usage
  - Less than Expected ☐
  - Expected ☐

### Wayang Outpost Final Report

(Source: EDUCAUSE data collection)

**Research design**
- Experimental design (Experimental and control groups)
- Massachusetts Comprehensive Assessment and MAP test available for treatment students only

**Specific student findings as measured by MCAS test**
- A trend of students passing the MCAS tests more often when using *Wayang Outpost* in comparison to the control groups (findings are not statistically significant).

**Specific student findings as measured by NWEA MAP test**
- *Wayang Outpost* students achieved gains in patterns and algebra sections of NWEA MAP as compared to control group students (p < 0.011).

**Specific teacher findings:** None reported.

**Greatest barrier(s)**
- Technical problems running the software on school computers
- Teachers were not used to the technology and even less to adaptive technologies where they could not control the pace for individual students, and only partially within a class session

**Future plans for scaling**
- An ONR award to combine ASSISTments and *Wayang Outpost* called MathSeeds.
SRI Teacher Survey Summary

(N = 7): Of the 7 respondents, 85.7% are classroom teachers, while 14.3% are youth program directors. Data is from 2011-2012 implementation.

Student gains

For the areas targeted by Wayang Outpost, how would you compare student gains as a result of using Wayang Outpost to expected gains in a traditional class without it?

- significantly more with it
- somewhat more with it
- about the same with it
- somewhat less with it
- significantly less with it

Student needs and engagement

Percent of teachers agreeing with the statement

- Students enjoy using it.
- Students are highly engaged while using it.
- Students have sufficient time to use it.
- It meets the learning needs of my students.

Training

57.14% of the teachers participated in some aspect of the training. Of these teachers, most teachers (75%) got training for 2 hours or less, and some teachers (25%) got between 3-9 hours of training.

Value of training

Teachers’ rating of the training

- extremely valuable
- very valuable
- moderately valuable
- slightly valuable
- not at all valuable

Percentage of Respondents (n = 4)

- 3 teachers did not receive training.

Impact

“The biggest impact on my students would be the hints. On other online games/activities, if they do not know the answer, they would just guess. With Wayang Outpost, they learned that the hints were no only very helpful, but also were useful on problems outside of Wayang Outpost.”

Recommendation

“I think it is important for students to see online games/activities that are not only fun but also educational. Some sites are alike in that matter, but they are not something that can keep a seventh grader tuned in for more than one session. I also think the amount of conversation I had with students about specific problems increased greatly. Being able to talk about the problems they were working on was very helpful.”

Challenges

“There were alot <sic> of technical issues. It wasn’t aligned with our curriculum <sic> and the training was minimal.”
**Grantee Organization Name:** University of South Florida St Petersburg / SunBay Mathematics

**Title:** SunBay Digital Mathematics for Middle Grades

**Targeted subjects:** Mathematics

**Targeted Common Core:** Math ☑ and/or ELA ☑

**Project description:** By using SunBay Digital Mathematics, students build mathematical meaning, thinking, and skills. Each unit presents math content through interactive technology so that students can explore and problem solve within guided structured activities. Besides content, SunBay Digital Mathematics also provides students practice in mathematical processes: representation, reasoning, interpreting, and communicating.

**Specific features provided:** Interactive whiteboard; Embedded formative assessments; Student materials in print/physical materials/instruments; Specific guidance for teachers on how to integrate the technology with their instruction; Other: multiple representations of the mathematical concept—chart, graph, table, and narrative. (Source: PI Survey 2012)

**Project implementation:** October, 2011 - May, 2012

**No-cost extension:** Yes. Grant period extended until December 31, 2012.

---

### Wave II Implementation Activity

(Source: SRI data collection - Teacher survey and PI survey)

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Proposed</th>
<th>Projected*</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Districts</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Schools</td>
<td>10</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Teachers</td>
<td>20-30</td>
<td>NR¹</td>
<td>26</td>
</tr>
<tr>
<td>Students</td>
<td>2500</td>
<td>2314</td>
<td>2304</td>
</tr>
</tbody>
</table>

*Projected figures are from the Implementation Schedule report Nov 8, 2011.
¹ NR = not reported

Did project meet target student numbers? -196

Administered NWEA MAP assessment ☑
Included in Wave 2 meta-analysis ☑

### Instructional time

<table>
<thead>
<tr>
<th></th>
<th>PI reported*</th>
<th>Teacher reported**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average during school (minutes)</td>
<td>55</td>
<td>53</td>
</tr>
<tr>
<td>Average outside of school (minutes)</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Average number of weeks used</td>
<td>6.6</td>
<td>6</td>
</tr>
<tr>
<td>Total average instructional time (hrs)</td>
<td>23.9</td>
<td></td>
</tr>
</tbody>
</table>

* Collected from PI survey in 2012
** Collected from teacher survey in 2012. 1 teacher’s response is out of range and is not included (n = 21).

<table>
<thead>
<tr>
<th>Did usage meet PI expectation?</th>
<th>Teacher usage</th>
<th>Student usage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less than expected</td>
<td>As expected</td>
</tr>
</tbody>
</table>

---

**SunBay Mathematics Final Report**

(Source: EDUCAUSE data collection)

**Research design**
- Pre-post assessment (no reliability/validation provided)
- Quasi-experiment (matched group on FCAT scores)
- Embedded assessments
- Workbook completion analysis
- Teacher survey
- Classroom recording

**Specific student findings**
- All students showed significant learning gains from pre-post test (p<.001)
- 8 out of 9 classes have positive effect size for SunBay on FCAT score compared to matched classrooms.
- The materials have high effect sizes for low, medium, and high performing classes on FCAT score compared to matched classrooms.
- Effect size using FCAT on average showed no difference compared to control group students

**Specific teacher findings**
- 22 out of 23 teachers said they would recommend SunBay Math to other teachers.

**Greatest barrier**
- Many classrooms did not have access to computers for the students. Arranging for computer lab time was problematic.

**Future plans for scaling**
- Have submitted a proposal to NSF’s Math-Science Partnership with an expected award announcement date of June 2013.
### SRI Teacher Survey Summary

**N = 22**: Of the 22 respondents, 95.5% are classroom teachers, while 4.6% are computer lab instructors or specialists.

### Student gains

For the areas targeted by **SunBay Mathematics**, how would you compare student gains as a result of using Sunbay Mathematics to expected gains in a traditional class without it?

<table>
<thead>
<tr>
<th>Comparison</th>
<th>% of Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significantly more with it</td>
<td>2%</td>
</tr>
<tr>
<td>Somewhat more with it</td>
<td>40%</td>
</tr>
<tr>
<td>About the same with it</td>
<td>30%</td>
</tr>
<tr>
<td>Somewhat less with it</td>
<td>20%</td>
</tr>
<tr>
<td>Significantly less with it</td>
<td>8%</td>
</tr>
</tbody>
</table>

### Student needs and engagement

Percent of teachers agreeing with the statement:

- Students enjoy using it: 80%
- Students are highly engaged while using it: 60%
- Students have sufficient time to use it: 50%
- It meets the learning needs of my students: 70%

### Training

100% of the teachers participated in some aspect of the training. 40.91% of the teachers got from 10-19 hours, and 40.91% got between 20-39 hours of training.

### Value of training

#### Teachers' rating of the training

- Extremely valuable: 90%
- Very valuable: 10%
- Moderately valuable: 0%
- Slightly valuable: 0%
- Not at all valuable: 0%

### Impact

"Sun Bay Mathematics showed students how to look more deeply into a concept and think about the math instead of just looking for a formula or shortcut. They felt challenged by the work but were able to complete it, so their confidence was raised as a result of Sun Bay Mathematics."

"The students were able to experience the nature of functions and graphical representations of covarying <sic> data. There was a direct connection/correlation to the expectations <sic> of their grade level and FCAT."

"It did not have a big impact. My students did not enjoy using it. They thought it was boring."

### Recommendation

"I would only recommend SunBay to other teachers if there were changes in the units. The information and ways that students learn are great, but it took way too much time out of our year and it was difficult to do the unit successfully."

"It is an excellent visual to help develop certain math concepts. After manipulating computer activities, students end up with deeper understanding of certain concepts."

"The dynamic technology helps bring the math to life for students."

### Challenges

"School-based availability of computers."
### Grantee Organization Name: University of Wisconsin - Madison / CoMPASS Physics

#### Title: Enhancing Literacy in Science Through Digital Text, Simulations, and Design Challenges: CoMPASS-Physics

#### Targeted subjects: Physics

#### Targeted Common Core: Math and/or ELA

#### Project description: The CoMPASS-Physics project consists of multiple modules that present physics concepts in two areas: Work & Energy and Forces & Motion. Each learning module combines both digital and face-to-face learning opportunities and interactions: a hypertext system (library of terms and concepts), design-project challenge, experiment using physical materials, scientist’s journal (student notebook), and instructional pacing to allow for student collaboration and discussion.

#### Specific features provided: Simulation technology; Embedded formative assessments; Embedded summative assessments; Student materials in print/physical materials/instruments; Specific guidance for teachers on how to integrate the technology with their instruction; Other: Teacher Materials and Sustained Teacher Professional Development throughout the implementation. (Source: PI survey)

#### Project implementation: January 2012 - June 2012

#### No-cost extension: Yes. Grant period extended until March 31, 2013.

### Wave II Implementation Activity

(Source: SRI data collection - Teacher survey and PI survey)

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Proposed</th>
<th>Projected*</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Districts</td>
<td>NR¹</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Schools</td>
<td>NR</td>
<td>12-17</td>
<td>11</td>
</tr>
<tr>
<td>Teachers</td>
<td>14</td>
<td>NR</td>
<td>17</td>
</tr>
<tr>
<td>Students</td>
<td>1200</td>
<td>1230</td>
<td>1053</td>
</tr>
</tbody>
</table>

*Projected figures are from the Implementation Schedule report Dec 19, 2011. ¹NR = not reported

<table>
<thead>
<tr>
<th>Instructional time</th>
<th>PI reported*</th>
<th>Teacher reported**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average during school</td>
<td>45</td>
<td>53.67</td>
</tr>
<tr>
<td>Average outside of school</td>
<td>20</td>
<td>2.33</td>
</tr>
<tr>
<td>Average number of weeks used</td>
<td>16.1</td>
<td>12.13</td>
</tr>
<tr>
<td>Total average instructional time (hrs)</td>
<td>52.5</td>
<td></td>
</tr>
</tbody>
</table>

* Collected from PI survey in 2012
** Collected from teacher survey in 2012

#### Did project meet target student numbers?

-147

- Did project meet target student numbers?
  - Administered NWEA MAP assessment
  - Included in Wave 2 meta-analysis

#### CoMPASS Physics Final Report

(Source: EDUCAUSE data collection)

#### Research design

- Pre/post assessments
  - Scientist’s IQ test: Alpha = .885
  - Physics Fiesta test: Alpha = .757
- Project created embedded assessments
- Qualitative analysis of students’ proposal writing
- Recruited schools already administering NWEA MAP assessments, effect size on average showed no difference compared to VCG

#### Specific student findings

- Students in all three districts that participated in the study made significant improvement on both Scientist’s IQ test and Physics Fiesta test from pre to post test.
- Students with low, medium or high prior knowledge (based on pre-test score) all improved significantly on both Scientist’s IQ test and Physics Fiesta test from pre to post test.
- Students’ prior knowledge and the level of scaffolding provided both affect students’ performance on embedded assessments.
- Over 80% of students in the total sample included at least one concept in their final proposal writing.
- Over 70% included design constraints tied to science concepts in their proposal writing.
- About 60% of students included at least one science relationship.
- Almost 70% of students did include data at least once in their final proposal writing.
### Specific teacher findings
None reported.

### Greatest barrier
- Schools need reliable and sustained computer access. The district technology staff needs to be involved in future implementation.
- Teachers need deeper strategic work on formative embedded assessment for differentiating feedback to students and improving instruction and learning.
- Science teacher alone cannot be responsible for reading and writing science literacy. It requires collaboration between science teachers and reading and language art teachers.

### Future plans for scaling
- Grants have been submitted to NSF and DOE to fund development and pilot testing of an eTextbook version of CoMPASS Physics, development and testing of life science materials similar to the physics material, and continued and expanded use of CoMPASS Physics in Milwaukee Public Schools and other interested districts.

### SRI Teacher Survey Summary

\((N = 15)\): Of the 15 respondents, 100% are classroom teachers.

#### Student gains

**For the areas targeted by CoMPASS Physics, how would you compare student gains as a result of using CoMPASS Physics to expected gains in a traditional class without it?**

<table>
<thead>
<tr>
<th>Comparison</th>
<th>0%</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
</tr>
</thead>
<tbody>
<tr>
<td>somewhat more with it</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>significantly more with it</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>about the same with it</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>somewhat less with it</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>significantly less with it</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Student needs and engagement

**Percent of teachers agreeing with the statement**

<table>
<thead>
<tr>
<th>Statement</th>
<th>0%</th>
<th>20%</th>
<th>40%</th>
<th>60%</th>
<th>80%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students enjoy using it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students are highly engaged while using it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students have sufficient time to use it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It meets the learning needs of my students.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Training

100% of the teachers participated in some aspect of the training. 53.33% of them got from 20-39 hours, and the rest of them (46.67%) got between 10-19 hours of training.

#### Teachers’ rating of the training

<table>
<thead>
<tr>
<th>Value of training</th>
<th>0%</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
</tr>
</thead>
<tbody>
<tr>
<td>extremely valuable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>very valuable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>moderately valuable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>slightly valuable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>not at all valuable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Impact

“My students could never have reached this level of understanding without CoMPASS Physics. Due to the conceptual nature, the roller coaster simulations brought facets and details I know students never would have obtained. The technology was a motivator, as was the level of challenge. Basically, my students were more engaged because of the simulation. The workbook coincided with the simulation and followed a predictable pattern <sic> the students grew comfortable with. Ease of use (technology) was a factor that helped engage slower learners.”

“It forces them to think “outside the box”. Science used to be a memorization of vocabulary and facts. It is now finding the relationships between ideas and using the important vocabulary on a day to day basis. Students also collaborate, discuss ideas, analyze data, and learn real science skills.”

### Recommendation

“Since we don’t have a science lab, it is very difficult to do hands on experiments into my classroom and having the CoMPASS Physics available for my students was a great way to integrate hands on. The students also took ownership of their work.”

“The students engage with a high level of science understanding, focus on key concepts that are aligned with core standards, and also work cooperatively in groups.”

### Challenges

“Student notebook: needs to use consistent phrasing & vocabulary Hints & “think like a scientist” tips need to more integrated better”

“I <the teacher> had to learn many physics concepts first before I could teach them. I needed to do the actually do the student work first, take appropriate notes (for lecture or “lead” teaching), and then introduce lesson to class.”
Grantee Organization Name: WNET - New York Public Media / GTM

Title: Get the Math (GTM)  
POC ☐ or ESA ☒

Targeted subjects: Mathematics, Physics
Targeted Common Core: Math ☒ and/or ELA ☐

Project description: Get the Math is a web-based, virtual work environment drawing from settings found in a variety of industries (music, video-games, fashion, restaurant, basketball, and special effects) to situate real-world algebra problems. Using videos and interactive tools, students can solve math problems typically found in that work environment. Teachers can access various resources including a training video, guide with lesson plans, and student handouts that are aligned with math common core content and practice standards.

Specific features provided: Simulation technology; Pedagogical agents; Embedded formative assessments; Embedded summative assessments; Options for students to ask for hints, definitions, alternative presentation features; Student materials in print/physical materials/instruments; Teacher customizable assessment system; Specific guidance for teachers on to how to integrate the technology with their instruction; Other: Real-world video vignettes; interactive web challenges; video solutions of teams solving challenges. (Source: PI Survey)

Project implementation: November 2011 - June 2012
No-cost extension: Yes. Grant period extended until March 31, 2013.

Wave II Implementation Activity
(Source: SRI data collection - Teacher survey and PI survey)

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Proposed</th>
<th>Projected*</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Districts</td>
<td>11</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>Schools</td>
<td>NR¹</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>Teachers</td>
<td>NR</td>
<td>NR</td>
<td>40</td>
</tr>
<tr>
<td>Students</td>
<td>4,000</td>
<td>NR</td>
<td>1621</td>
</tr>
</tbody>
</table>

*Projected figures are from the Implementation Schedule report Oct 27, 2011. ¹ NR = not reported

Did project meet target student numbers?  
Administered NWEA MAP assessment ☐
Included in Wave 2 meta-analysis ☐

<table>
<thead>
<tr>
<th>Instructional time</th>
<th>PI reported</th>
<th>Teacher reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average during school (minutes)</td>
<td>45</td>
<td>43.67</td>
</tr>
<tr>
<td>Average outside of school (minutes)</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>Average number of weeks used*</td>
<td>26.7</td>
<td>1.67</td>
</tr>
<tr>
<td>Total average instructional time (hrs)</td>
<td>1.96</td>
<td></td>
</tr>
</tbody>
</table>

* Indicates total time working in schools. Implementation interrupted by Hurricane Sandy.

Did usage meet PI expectation?  
Teacher usage: Less than expected
Student usage: Less than expected

Get the Math Final Report
(Source: EDUCAUSE data collection)

Research design
• Embedded assessment
• Qualitative analysis of the student worksheet
• Online teacher survey
• Student attitude survey
• Recruited schools already administering NWEA MAP assessments, but could not secure data because of IRB restrictions
• Outside evaluation services: Fisch, 2012. Get the Math: Impact on Students' Use of Algebra

Specific student findings using project developed assessment
• Students produced significantly more complete and sophisticated solutions on each of the three Get the Math modules than they had in the pretest. (P<0.001)
• After using Get the Math, 64% of the students said they could name ways in which algebra is used in the real world.
• Students whose favorite subject was math or algebra performed better than other students in the Music and Basketball tasks (p=0.001), but not in Fashion tasks.

Specific teacher findings
• Most teachers rated Get the Math positively in terms of its educational value, appeal/engagement for students, and value/usefulness for teachers, and 65% reported that their students had learned or benefited from using Get the Math.
• 80% of the teachers said they either “might use” (40%) or “definitely will use” (40%) Get the Math with other students in the future.
<table>
<thead>
<tr>
<th>Greatest barrier</th>
<th>Future plans for scaling</th>
</tr>
</thead>
<tbody>
<tr>
<td>• During the final interview recruitment of participants was cited as the greatest barrier. New Jersey State where the implementation took place was undergoing major changes in curriculum and requirements. Many teachers felt that they could take on a new implementation.</td>
<td>• Continuing to seek new partner outlets for the broadcasts</td>
</tr>
<tr>
<td>• Recruitment of teacher participants was conducted through school administration proved to be more challenging than asking for volunteers.</td>
<td>• Working on awareness strategies to drive viewership to website and online resources</td>
</tr>
</tbody>
</table>

**SRI Teacher Survey Summary**

\((N = 4)\): Of the 4 respondents, 100% are classroom teachers.

No further results are not presented in this area because the number of respondents was less than 5.
**Grantee Organization Name:** Worcester Polytechnic Institute / ASSISTments

**Title:** ASSISTments: Using Web-based Technologies to Support Grades 7-9 Mathematics

**Targeted subjects:** Mathematics

**Targeted Common Core:** Math ☑ and/or ELA ☐

**Project description:** ASSISTments is a Web-based intelligent tutoring system. Teachers use it to manage and assign homework, and post resources in math and science. It allows teachers to write individual student ASSISTments (guidance in the form of questions, hints, solutions, web-based videos, etc.). The system reports individual student feedback while reporting the results of the embedded assessments to the teacher.

**Specific features provided:** Intelligent tutoring (adaptive tutorial system); Embedded formative assessments; Embedded summative assessments; Options for students to ask for hints, definitions, alternative presentation features; Teacher customizable assessment system; Dashboard providing teacher with learning data for each student and whole class; Specific guidance for teachers on how to integrate the technology with their instruction. (Source: PI Survey)

**Project implementation:** September 2011 - June 2012

**No-cost extension:** Yes. Grant period extended to December 31, 2012.

### Wave II Implementation Activity
(Source: SRI data collection - Teacher survey and PI survey)

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Proposed</th>
<th>Projected*</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Districts</td>
<td>NR¹</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Schools</td>
<td>NR</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Teachers</td>
<td>25</td>
<td>NR</td>
<td>8</td>
</tr>
<tr>
<td>Students</td>
<td>10,000</td>
<td>500</td>
<td>481</td>
</tr>
</tbody>
</table>

*Projected figures are from the Implementation Schedule report Nov 8, 2011.

¹ NR = not reported

**Did project meet target student numbers?** N/A

Note: The project reached many more students, but for the purposes of the research only 500 were targeted. 20,000 student users were reached.

Administered NWEA MAP assessment ☐

Included in Wave 2 meta-analysis ☑

<table>
<thead>
<tr>
<th>Instructional time</th>
<th>PI reported*</th>
<th>Teacher reported**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average during school (minutes)</td>
<td>10</td>
<td>18.50</td>
</tr>
<tr>
<td>Average outside of school (minutes)</td>
<td>25</td>
<td>17.50</td>
</tr>
<tr>
<td>Average number of weeks used</td>
<td>NR¹</td>
<td>25.88</td>
</tr>
<tr>
<td>Total average instructional time (hrs)</td>
<td></td>
<td>31.09</td>
</tr>
</tbody>
</table>

*Collected from PI survey in 2012
** Collected from teacher survey in 2012. 1 teacher’s response is out of range and is not included (n = 8).

¹ NR = not reported

**Did usage meet PI expectation?**

Teacher usage As expected

Student usage As expected

### ASSISTments Final Report
(Source: EDUCAUSE data collection)

**Research design**
- Specifically recruited NWEA MAP using schools to participate in the evaluation.
- Quasi-experimental, ASSISTments compared to a virtual control group
- Prior randomized trials research indicates the potential to achieve results at scale

**Specific student findings**
- Effect size using NWEA MAP on average showed statistically significant growth compared to VCG

**Specific teacher findings:** not reported

**Greatest barrier**
- No major barrier

**Future plans for scaling**
- Scale to 1 million students over five years
- Offer ASSISTments to third world countries
- Scale up via partnership with Education Service Agencies
SRI Teacher Survey Summary

(N = 9): Of the 9 respondents, 88.9% are classroom teachers, while one is a special services provider.

Student gains

For the areas targeted by ASSISTments, how would you compare student gains as a result of using ASSISTments to expected gains in a traditional class without it?

<table>
<thead>
<tr>
<th>Rating</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>significantly more with it</td>
<td>33.33%</td>
</tr>
<tr>
<td>somewhat more with it</td>
<td>66.67%</td>
</tr>
<tr>
<td>about the same with it</td>
<td>0%</td>
</tr>
<tr>
<td>somewhat less with it</td>
<td>0%</td>
</tr>
<tr>
<td>significantly less with it</td>
<td>0%</td>
</tr>
</tbody>
</table>

Student needs and engagement

Percent of teachers agreeing with the statement

<table>
<thead>
<tr>
<th>Statement</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students enjoy using it.</td>
<td>90%</td>
</tr>
<tr>
<td>Students are highly engaged while using it.</td>
<td>66.67%</td>
</tr>
<tr>
<td>Students have sufficient time to use it.</td>
<td>66.67%</td>
</tr>
<tr>
<td>It meets the learning needs of my students.</td>
<td>66.67%</td>
</tr>
</tbody>
</table>

Training

100% of the teachers participated in some aspect of the training. Most teachers (66.67%) got from 20-39 hours, and the rest of teachers (33.33%) got between 40 hours or more of training.

Value of training

Teachers' rating of the training

extremely valuable | 50% |
very valuable      | 40% |
moderately valuable| 10% |
slightly valuable  | 0%  |
not at all valuable| 0%  |

Selected Teacher Comments

Impact

“It forced me to reflect on how I am teaching certain things to my students. I now know that certain students respond better to these types of activities and it can help them gain a better understanding of a concept.”

“The feedback that both the students and I get is invaluable. It helps direct my teaching and it allows the students to know how they are doing on their homework instead of waiting till the next day to get the answers.”

Recommendation

“The variety of questions I can use with the students. I like that the students know if the answer to wrong or right when they are doing the problems and forces them to keep working instead of giving up or writing anything just to be done.”

“The students feel much more secure knowing there are examples and hints for them to use. Once they understand and have mastered the concept, they don’t have to keep doing work in order to complete an assignment. The assignments are reassigned automatically to reinforce mastery. Who wouldn’t want to use these??????”

Challenges

“Sometimes it was difficult to integrate other media and files into ASSISTments. It has improved with time and experience.”

- Continue to conduct efficacy research using experimental and quasi-experimental designs
Appendix B – Technical Details¹

TECHNICAL DETAILS OF META-ANALYSIS ........................................................................................................ 1
MODERATOR ANALYSIS: FACTORS ASSOCIATED WITH DIFFERENCES IN STUDENT OUTCOMES
........................................................................................................................................................................ 3
TECHNICAL DETAILS OF NWEA MAP, VIRTUAL COMPARISON GROUP AND ADJUSTED NORM
GROUP ANALYSIS .................................................................................................................................................. 6
ALIGNMENT TO COMMON CORE STATE STANDARDS .......................................................................................... 17
TEACHER SURVEY ................................................................................................................................................ 26

¹ Ying Zheng, Larry Gallagher, Gloria I. Miller, and Robert Murphy contributed to the Technical Appendix.
Meta-analysis

The first evaluation question—What impact do the Wave II project solutions have on students’ mastery of middle grade content aligned with CCSS?—was answered through a meta-analysis of student learning outcome data. The source for the meta-analysis was learning outcome data from grant project evaluations/final reports or NWEA MAP. Student outcomes reported by grant projects included project-developed assessments of knowledge and skills and standardized assessments of knowledge and skills.

A total of 19 grant projects participated in Wave II; 12 of them submitted data that met all the requirements for the meta-analysis.

- Research design that was either experimental (random assignment to treatment or comparison group) or quasi-experimental (comparison group identified)
- Assessment measures that were administered to both treatment and comparison groups (two test administrations—pretest and posttest bracketing the project solution implementation)
- Standard deviation that could be calculated on the basis of score variability

Of the seven projects not included in the meta-analysis, five did not have a comparison group, one did not have posttest data, and one could not supply data access because of IRB restrictions.

To extract effect size data, SRI analysts entered numeric data that met two criteria into Biostat’s Comprehensive Meta-Analysis software:

- Sufficient data elements were provided for both the NGLC group and the comparison group to calculate an effect size.
- The sample size of both the Wave II group and the comparison group was 25 or larger.

Effect sizes were calculated in two ways depending on the form of data provided:

1. Continuous data, posttest only—When grantees reported measures on a continuous scale (e.g., final grades), the sample size, mean, and standard deviation of both the NGLC and the comparison group were used to compute the effect size.

   \[ g = \frac{\bar{x}_1 - \bar{x}_2}{s^*} \quad s^* = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}} \]

2. Pretest and posttest—When student performance on both a pretest and posttest were reported, the sample size, pretest mean, posttest mean, and pre- and post-test standard deviations for both the Wave II and the comparison group were used to compute an effect size.

   \[ d = \frac{Mean\ Change(NGLC) - Mean\ Change(comparison)}{SD\ Post\ Pooled} \]
The program computes the Cohen’s $d$ and then multiplies $d$ by a correction factor ($J$) to compute the effect size as calculated by Hedges’s $g$.

$$J = 1 - \frac{3}{4 \cdot df - 1}$$

$$g = d \cdot J$$

**Multiple Outcomes**

In general, nonredundant outcomes were all included in the meta-analysis. However, one project, Hofstra, provided two measures. The average effect size was used to report the overall outcome for Hofstra.

**Multiple Subgroups**

In some cases, the grantees included data disaggregated by school site, teacher, and/or grade level. When such finer grained information was provided, SRI analysts extracted the data. Each school site, teacher, or grade level was treated as a subgroup of the project in the meta-analysis so that the analysis could be done at either the subgroup level or project level. When the project was used as the unit of analysis, the software collapsed the subgroups within each subgroup and imputed the values for the full project.

**Meta-analysis Models**

Because the treatment varied substantially from one project to another, a random effects model was applied in the meta-analysis. Hedges’s $g$ was used as the index to report effect sizes.

The unit for the main meta-analysis was the project rather than a subgroup (school site, teacher, or grade level). For several ancillary meta-analyses of hypotheses about differences between subject matter or grade levels, the subject or grade level was treated as the unit of analysis, with the consequence that projects that did not provide disaggregated data had to be excluded from the analysis.

**Moderators**

After the computation of average effect size across projects, the analysts used Biostat’s Comprehensive Meta-Analysis software to test whether various aspects of a project moderated its effectiveness (i.e., whether a significant correlation existed between the variable and the size of the Wave II effect). The following variables were tested as potential moderators:

- Grant type (POC or ESA)
- Subject area assessed
- Average calculated instructional time based on teacher survey data
- Assessment type (project-developed or standard assessment)
- VCG or ANG analysis model if applicable.
Moderator Analysis: Factors Associated with Differences in Student Outcomes

The second evaluation question was whether the effectiveness of the Wave II innovations varied for different kinds of innovations, schools, students, or treatment doses. If we had had more effect size estimates in our meta-analysis, we could have tested the influence of these factors statistically. With just 12 effect estimates, we could examine the average effect for different subgroups of projects but could not draw any firm conclusions.

Figure B-1 shows the average effect size for the three academic subjects assessed by different projects. The data suggest that the mathematics and language arts innovations had no effect and that the science innovations tended to depress achievement. However, the data on science achievement in this analysis came from a single project with a small sample size. Additionally, the science assessments (NWEA Science Concepts & Processes, General Science) are not considered to be aligned with CCSS or Next Generation Science Standards.

Note: Although NCSU and SMALLab innovations targeted science learning, they chose to assess reading and mathematics, respectively.

Figure B-1. Effect size estimates by subject area

For most projects, IRB restrictions limited the availability of demographic data to a student’s grade level. The average effect estimates for students from different grade levels
are shown in Figure B-2. The apparently positive effect for students in combined grade 7/grade 8 is from the data from the iCivics project, which administered its own essay-based assessment in both treatment and comparison classes. The much wider confidence interval for 9th-grade and 10th-grade students may be attributable in part to the smaller sample sizes in these two grade levels.

![Figure B-2. Effect estimates by grade level](image)

**Note:** The sample size for each of the categories is at the subgroup level not the project level. In most cases, individual projects worked across multiple grade levels.

To explore the question of whether the amount of time using the Wave II innovation was related to student outcomes, we divided the projects in the meta-analysis into three groups of four (tertiles of the instructional hours distribution) according to the amount of time teachers reported students used the solution (High = 48 to 204 hours, Medium = 26 to 32 hours, and Low = 6 to 24 hours). None of the project subgroups had an average student outcome different from 0 (Figure B-3). The wide confidence interval around the estimate for low-use projects reflects the fact that many of these were small-scale pilots of brief interventions.
Figure B-3. Effect estimates by instructional time
NWEA MAP, Virtual Comparison Group and Adjusted Norm Growth Analysis

The Measures of Academic Progress developed by the Northwest Evaluation Association is a computer-adaptive assessment. That is, the difficulty of the next question a student sees is adjusted depending on how the student answered the previous question. In this way, each student gets an individualized assessment containing the number of prescribed items. MAP was used to measure the impact of student achievement for some of the grant projects. This measure was selected by the foundation for use with Wave II projects in part because of the Massachusetts State version was deemed the best CCSS-aligned existing assessment. It also had the advantage of scores reported on a Rasch Unit scale (RIT)². A student’s score is based on the item difficulty level at which he/she is able to answer questions correctly. The RIT scale is an equal-interval scale, which means that a unit difference between scores at the top, middle, and bottom of the distribution represents the same difference in ability and has a consistent interpretation across a range of ages and grade levels.³

RIT Score Range and Bands
Technically, RIT scores can range from a low of 100 to a high of 300. In practice, scores typically range from 120 to about 260, with some variations due to subject matter. Student scores for English language arts-reading in the 150 to 190 range for English Language Arts-Reading are typical in the third and fourth grades, whereas scores above 220 are typically associated with high school-level students.

Versions of NWEA MAP

NWEA uses a very large bank of test questions for each subject area. It attaches metadata to each question to indicate its level of difficulty, the target subject and subtopic within the area, and the standards it addresses. The metadata make it possible to segment the large item banks to create tailored assessments. There are three divisions of MAP based on grade level: kindergarten to grade 2 (MAP for Primary Grades), grades 2 to 5, and grades 6+. The difficulty of items on any of these assessments ranges from well below to far above the indicated grade levels, making the assessments useful when working with students with widely varying achievement levels. For example, the 6+ Goals Survey MAP item bank contains questions rated at a difficulty as low as grade 2 and as high as above grade 12. For the Wave II research, projects administering the MAP used the 6+ Goals Survey Massachusetts State Version. NWEA recommended this version of the test as providing the best available alignment with the new Common Core State Standards (although it was developed before those standards were finalized).

The English Language Arts-Reading MAP contains 42 items (every student sees 42 items although adapted for ability) that can be grouped to produce scores for five subgoal areas (subscales):

² Rasch Unit.
³ For a description of the RIT scale, refer to http://www.nwea.org/support/article/532
• Language: Vocabulary and Concept Development; Reading and Literature; Beginning Reading
• Understanding a Text: Imaginative/Literary Texts
• Understanding a Text: Informational/Expository
• Genre/Elements of Fiction and Nonfiction
• Style and Language.

The Mathematics MAP contains 52 items and six subgoal areas:
• Number Sense and Operations
• Patterns, Relations, and Algebra
• Geometry
• Measurement
• Data Analysis, Statistics, and Probability
• Problem Solving and Proofs.

The Science Concepts and Processes/General Science MAP has 45 items and five subgoal areas:
• Unifying Concepts of Science
• Scientific Inquiry
• Life Sciences
• Earth/Space Sciences
• Physical Sciences.

**Measurement Error**

Every measurement tool has some amount of error. The standard errors of NWEA MAP overall test scores for individuals typically range between 2.9 to 3.7. For example, a student’s test score reported as 190 with a standard error of 2.9 could be as low as 187.1 or as high as 192.9 if the student were retested immediately. All students’ test scores should be interpreted using these error bands.

Ranging between 5.8 and 7.4, the standard errors of MAP subscale scores are twice those of overall test scores (because fewer questions constitute the subscale.) For this reason, the VCG methodology cannot be applied at the subscale level.

**Virtual Comparison Group Formation**

Projects using the MAP assessment did not need to recruit a comparison group of students because the NWEA data bank holds student records that can be used to construct a virtual comparison group. It is important to consider the technical details of NWEA’s process of VCG formation when interpreting the impact estimates that result from this method. The following information is paraphrased from the technical specifications and processes provided by NWEA.
**Time Between Test Events**

To qualify to begin the VCG formation process, Wave II project students must have had 10 weeks of instruction between the first test (pretest) and the second test (posttest). The intervention itself did not need to consume the entire 10 weeks (roughly 50 hours of instruction), but the time between the pre- and post-tests must have been at least 10 weeks. With shorter intervals, there would not be a measureable amount of student growth, given the amount of measurement error in the MAP.

Of those projects for which MAP data were available by August 2013,

- Three (SMALLab, UWisc, and WPI) used existing district NWEA data collections administered in either 2011–12 or 2012–13 in a fall-to-fall yearly testing pattern.
- Three (Classroom Inc, DaVinci Minds, EdNovo, and LVS) administered NWEA MAP for the purposes of the project and met the requirement for 10 weeks between pre- and post-test.
- Two (NCSU and Texas Tech) administered NWEA MAP for the purposes of the project but had 8 weeks or less between tests, so no VCG formation was pursued. The Texas Tech project participants did not take a posttest, so no pre-to-post-test difference could be calculated.

**Variables Used to Locate a Potential VCG**

Three levels of variables are used to match a treatment group to NWEA’s larger data pool to produce a VCG.

Level 1 variables (general filters)

a. Only students with valid scores are used.

b. VCG students must have taken the pre and post MAP administrations in the same time frame as the students being matched.

c. Students in the treatment and VCG groups must have scores on the same MAP test (either Mathematics or ELA-Reading).

Level 2 variables (school-level filters)

d. Potential VCG students must have attended schools that had a percentage of children participating in the free or reduced-price lunch program within plus or minus 15% of the school for which the analysis was created. SRI provided NWEA with NCES codes for all schools in the sample for use in making this determination.

e. Potential VCG students must have attended schools that are classified in the National Center for Educational Statistics (NCES) Public School Universe Survey with the same “urban/rural” classification as the school for which the analysis report was created.

Level 3 variables (student-level filters)

f. Potential VCG students must have been in the same grade as the students for whom the analysis report was created.

g. Potential VCG students must have had a pretest RIT score within 5 RITs of the students for whom the analysis report was created.
h. Potential VCG students must have had a pretest date within 18 days of the pretest date for the treatment group student who is being matched and a posttest date within 18 days of the treatment student’s posttest date.

i. Potential VCG students must not be from the same district as the treatment student for whom the analysis report is being created.

Process of Creating a VCG
NWEA applies Level 1, Level 2, and Level 3 filters to its entire Growth Research Database (the data pool of students available to NWEA) to identify matches for each treatment student in the analysis. The goal is to identify 51 matches for each student in the treatment sample. If the number of qualified matches for a treatment student exceeds 51, a random sample of 51 matches is drawn. The matches for all the treatment students are then aggregated to create the final VCG.

Data Pool Availability
Each MAP student in the Wave II project schools was matched with up to 51 similar students across the United States as noted. The mean of the posttest scores of these similar students was considered a “virtual comparison” score. The Growth Research Database has hundreds of thousands of student test scores, but the number of students taking either the mathematics or ELA-reading assessment for the grade specified during the time frame specified is much smaller. Those students taking a yearly NWEA MAP assessment, either fall-to-fall or spring-to-spring, produce the largest data pool available for matching. The data pool is reduced to fewer matches when seeking to match a winter-to-spring implementation such as those that occurred for the NGLC Wave II projects. The VCG formed for the Classroom Inc. project had an average of 42 matches per student (3 = minimum, 51 = maximum for any Classroom Inc. student). EdNovo, LVS, SMALLab, UWisc, and WPI all had a 51 to 1 match ratio.

Calculation of Impact Estimates
Once the VCG is created, the comparative analysis is conducted. Each treatment student is placed into a RIT band using the starting RIT score (pretest). Then the difference between the pretest and posttest score is calculated for the student (growth). The calculated growth is then compared with the average VCG growth to produce the VCG Index. When the VCG Index is positive, students in the treatment group registered more growth than the VCG; when it is negative, treatment students demonstrated less growth than the VCG.

We modeled the difference between the Wave II project student scores and their virtual comparison scores using a simple impact model of the form (error terms are dropped).

\[ \hat{D} = \beta_0 \]

When \( \hat{D} \) was greater than zero, the Wave II project students out-scored their virtual comparison counterparts. For comparing subgroups, we expanded the above model to
$$\bar{D} = \beta_{0g1} + \beta_{1g2}$$

This generated two difference estimates, one for each subgroup category.

**VCG Analysis**

The following discussion is based on example data and is meant to illustrate the process of analysis only. For the Wave II project data, the analysis was conducted at all grade levels where data were present.

Figure B-4 displays the results of applying the VCG methodology to example data. In this example, only the grade 8 treatment group had a large enough sample size (Table B-1) to be statistically significant. The eighth-graders’ mean RIT was 6.5 points below the mean for the VCG, meaning that they showed less growth than average for similar students on the MAP. While the other grade-level samples are too small to be considered reliable, none of them had an average RIT larger than that of the corresponding VCG.

![Growth Relative to VCG Targets](image)

**Figure B-4. Average grade-level student growth relative to VCG**

Table B-1 shows the effect sizes for each grade level in example data. As noted, only the grade 8 sample is large enough to produce a statistically significant estimate.

**Table B-1. Sample Data Relative Growth and Effect Size as Compared with the VCG**
### Analysis of Norms Growth and Adjusted Norms Growth

In addition to a VCG analysis, we also used an adjusted norms growth analysis because it could be applied to the two projects with pre and post MAP data that did not meet the 10-week time interval requirement. The key difference between this and the VCG analysis is that students in the norms table are not drawn from similar schools as the treatment group— it is a national sample of students that took MAP. NWEA publishes a Norms Report every few years. The published norms growth tables are based on empirical data derived from actual student test scores. The purpose of this information is to provide

... a way for users of Measures of Academic Progress® achievement tests to consistently and accurately reference the performance of present and future students to performance expected in the population...

Test events used to construct the norms were taken from operational tests that are in routine use in schools; special recruiting to achieve sample representativeness was avoided, in favor of a post-stratification procedure to achieve representativeness to the target (U.S. school-age) population. Using operational tests requires that the time of test administration cannot be arbitrarily imposed. To be used in improving the precision of norm references the time of test administration must be accounted for within the conceptual and analytic framework. Results from this norming study, therefore, reference performance that is related to scales of measurement and are representative of their target population. Moreover, achievement estimates came from operational tests administered in active testing programs, and since instructional schedules were known for each school, varying test administration times were anchored to instructional time and accounted for in the analysis.


<table>
<thead>
<tr>
<th>Grade (# of scores)</th>
<th>Growth relative to VCG</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 (3)</td>
<td>-2.7</td>
<td>-0.18</td>
</tr>
<tr>
<td>7 (2)</td>
<td>-15.0</td>
<td>-1.04</td>
</tr>
<tr>
<td>8 (67)</td>
<td>-6.5</td>
<td>-0.44*</td>
</tr>
<tr>
<td>9 (12)</td>
<td>-4.2</td>
<td>-0.20</td>
</tr>
</tbody>
</table>

* p < .05
Normative Data Reports

NWEA’s Norms Report is organized into tables by grade and subject matter test. Table B-2 is taken from the 2011 Norms report4 and shows average student scores for tests taken at varying points during the school year.

Table B-2. Means (M) and Standard Deviations (sd) of Academic Growth by Starting RIT Score and Starting Instructional Week for Various Ending Instructional Weeks - Reading, Grade 6

<table>
<thead>
<tr>
<th>Start Inst.</th>
<th>Start RIT</th>
<th>Start Grade</th>
<th>4</th>
<th>8</th>
<th>12</th>
<th>16</th>
<th>20</th>
<th>24</th>
<th>28</th>
<th>32</th>
<th>36</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wk</td>
<td>M</td>
<td>sd</td>
<td>M</td>
<td>sd</td>
<td>M</td>
<td>sd</td>
<td>M</td>
<td>sd</td>
<td>M</td>
<td>sd</td>
<td>M</td>
</tr>
<tr>
<td>210</td>
<td>0.7</td>
<td>4.65</td>
<td>1.5</td>
<td>4.80</td>
<td>2.1</td>
<td>5.03</td>
<td>2.7</td>
<td>5.35</td>
<td>3.0</td>
<td>5.73</td>
<td>3.1</td>
</tr>
<tr>
<td>215</td>
<td>0.7</td>
<td>4.65</td>
<td>1.4</td>
<td>4.80</td>
<td>2.0</td>
<td>5.03</td>
<td>2.5</td>
<td>5.35</td>
<td>2.9</td>
<td>5.73</td>
<td>2.9</td>
</tr>
<tr>
<td>220</td>
<td>0.7</td>
<td>4.65</td>
<td>1.4</td>
<td>4.80</td>
<td>2.0</td>
<td>5.03</td>
<td>2.4</td>
<td>5.35</td>
<td>2.7</td>
<td>5.73</td>
<td>2.6</td>
</tr>
<tr>
<td>225</td>
<td>0.7</td>
<td>4.65</td>
<td>1.3</td>
<td>4.80</td>
<td>1.9</td>
<td>5.03</td>
<td>2.3</td>
<td>5.35</td>
<td>2.6</td>
<td>5.73</td>
<td>2.6</td>
</tr>
<tr>
<td>230</td>
<td>0.6</td>
<td>4.65</td>
<td>1.3</td>
<td>4.80</td>
<td>1.8</td>
<td>5.03</td>
<td>2.2</td>
<td>5.35</td>
<td>2.5</td>
<td>5.73</td>
<td>2.4</td>
</tr>
<tr>
<td>235</td>
<td>0.6</td>
<td>4.65</td>
<td>1.2</td>
<td>4.80</td>
<td>1.7</td>
<td>5.03</td>
<td>2.1</td>
<td>5.35</td>
<td>2.3</td>
<td>5.73</td>
<td>2.3</td>
</tr>
<tr>
<td>240</td>
<td>0.6</td>
<td>4.65</td>
<td>1.1</td>
<td>4.80</td>
<td>1.6</td>
<td>5.03</td>
<td>2.0</td>
<td>5.35</td>
<td>2.2</td>
<td>5.73</td>
<td>2.1</td>
</tr>
</tbody>
</table>

Ending Instructional Weeks

<table>
<thead>
<tr>
<th>Focal Grade</th>
<th>M</th>
<th>sd</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>M</td>
<td>sd</td>
</tr>
<tr>
<td>175</td>
<td>0.9</td>
<td>4.65</td>
</tr>
<tr>
<td>180</td>
<td>0.9</td>
<td>4.65</td>
</tr>
<tr>
<td>185</td>
<td>0.8</td>
<td>4.65</td>
</tr>
<tr>
<td>190</td>
<td>0.8</td>
<td>4.65</td>
</tr>
<tr>
<td>200</td>
<td>0.8</td>
<td>4.65</td>
</tr>
<tr>
<td>205</td>
<td>0.7</td>
<td>4.65</td>
</tr>
<tr>
<td>210</td>
<td>0.7</td>
<td>4.65</td>
</tr>
<tr>
<td>215</td>
<td>0.7</td>
<td>4.65</td>
</tr>
<tr>
<td>220</td>
<td>0.7</td>
<td>4.65</td>
</tr>
<tr>
<td>230</td>
<td>0.6</td>
<td>4.65</td>
</tr>
<tr>
<td>235</td>
<td>0.6</td>
<td>4.65</td>
</tr>
<tr>
<td>240</td>
<td>0.6</td>
<td>4.65</td>
</tr>
</tbody>
</table>

20

<table>
<thead>
<tr>
<th>M</th>
<th>sd</th>
</tr>
</thead>
<tbody>
<tr>
<td>175</td>
<td>0.9</td>
</tr>
<tr>
<td>180</td>
<td>0.8</td>
</tr>
<tr>
<td>185</td>
<td>0.8</td>
</tr>
<tr>
<td>190</td>
<td>0.7</td>
</tr>
<tr>
<td>200</td>
<td>0.7</td>
</tr>
<tr>
<td>205</td>
<td>0.7</td>
</tr>
<tr>
<td>210</td>
<td>0.7</td>
</tr>
<tr>
<td>215</td>
<td>0.6</td>
</tr>
<tr>
<td>220</td>
<td>0.6</td>
</tr>
<tr>
<td>225</td>
<td>0.6</td>
</tr>
<tr>
<td>230</td>
<td>0.6</td>
</tr>
<tr>
<td>235</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Source: NWEA 2011 Normative Data Report; used by permission.

The scores are all for students who took the MAP assessment in grade 6. Looking at starting week 16, for example, this nationally normed sample of sixth-grade students tested in week 16 of the academic year (beginning of February) scored on average between 175 and 240. The average RIT score gain that can be expected at week 20 ranges between 0.9 and 0.6. Note that a very highly skilled sixth--grade student (e.g., with a 240 Start RIT) will

---

on average show less growth than a sixth-grade student with a very low Start RIT score (e.g., 175 RIT) when measured again at week 36 (end of year).

Below, we provide an example of an ANG analysis, using Classroom, Inc. data.

**Example Norms Data and Analysis**

NWEA interpolated the data used in the estimate of effect size for ANG from the 2011 Norms data set and provided the data to SRI in a tabular format. The grade 8 interpolated norms matching the time period when students in the Classroom Inc. group took the MAP test are shown in Table B-3.

**Table B-3. Score Statistics and Interpolated 2011 RIT Scale Norms for Grade 8 Classroom, Inc.**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>160</td>
<td>2</td>
<td>159.00</td>
<td>153.74</td>
<td>-5.26</td>
<td>2.21</td>
</tr>
<tr>
<td>170</td>
<td>5</td>
<td>171.62</td>
<td>167.57</td>
<td>-4.05</td>
<td>2.01</td>
</tr>
<tr>
<td>180</td>
<td>2</td>
<td>180.81</td>
<td>185.98</td>
<td>5.17</td>
<td>1.02</td>
</tr>
<tr>
<td>190</td>
<td>11</td>
<td>190.21</td>
<td>186.33</td>
<td>-3.88</td>
<td>1.13</td>
</tr>
<tr>
<td>200</td>
<td>12</td>
<td>200.99</td>
<td>191.84</td>
<td>-9.15</td>
<td>0.74</td>
</tr>
<tr>
<td>210</td>
<td>21</td>
<td>210.97</td>
<td>199.78</td>
<td>-11.19</td>
<td>0.25</td>
</tr>
<tr>
<td>220</td>
<td>24</td>
<td>219.03</td>
<td>208.16</td>
<td>-10.87</td>
<td>-0.02</td>
</tr>
<tr>
<td>230</td>
<td>7</td>
<td>228.80</td>
<td>224.56</td>
<td>-4.24</td>
<td>-0.23</td>
</tr>
<tr>
<td>240</td>
<td>1</td>
<td>235.18</td>
<td>223.43</td>
<td>-11.75</td>
<td>-0.76</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>85</strong></td>
<td><strong>206.66</strong></td>
<td><strong>198.30</strong></td>
<td><strong>-8.35</strong></td>
<td><strong>0.48</strong></td>
</tr>
</tbody>
</table>

The last column in the table contains the interpolated normative growth values NWEA computed—that is, the mean growth of a national sample of students within a given RIT band. For RIT bands 220 through 240, normative growth was negative. (This is not a typing error.) Clearly, these were based on empirical results; students tested very close to the end of the school year apparently perform less well than students who are tested several weeks earlier. We speculate that this reflects end-of-year fatigue or lack of interest and that it is a common phenomenon.

To compute effect sizes of the growth estimates, we calculated mean growth for the treatment sample. The eighth-grade sample, mean growth was -8.35. The comparable mean growth based on interpolated 2011 norms was +0.48. Thus, the average student in the example treatment group experienced 8.83 points less growth than similar students in the MAP norming sample. For eighth-grade reading, the nationwide standard deviation in the spring (which is when these final scores
were recorded) was 14.84. The final step in the calculation was to divide the
difference between treatment group and norming group means by the standard
delegation: 8.83 points behind is equal to an effect size of $-8.83 / 14.84 = -0.595$, or -0.60. That is, the difference between the sample students and the MAP National Norm students was equivalent to -0.6 standard deviations of the spring test scores.

**Data Used to Compute the ANG**
The information used in Figure 2 in the main body of NGLC Wave II Final Evaluation Report is the effect size based on ANG for each of the three Wave II projects for which data were available. The derivation of these effect sizes is shown Table B-4.

**Table B-4. Data Used for ANG Analysis**

<table>
<thead>
<tr>
<th>Grantee</th>
<th>Grade</th>
<th>Student ($n$)</th>
<th>Avg. Pre-Test RIT</th>
<th>Avg. Post-test RIT</th>
<th>Used in Meta-analysis</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom Inc.</td>
<td>6th</td>
<td>4</td>
<td>183.47</td>
<td>187.22</td>
<td>No</td>
<td>0.21</td>
</tr>
<tr>
<td></td>
<td>7th</td>
<td>3</td>
<td>187.02</td>
<td>180.62</td>
<td>No</td>
<td>-0.53</td>
</tr>
<tr>
<td></td>
<td>8th</td>
<td>85</td>
<td>206.66</td>
<td>198.30</td>
<td>Yes</td>
<td>-0.60</td>
</tr>
<tr>
<td></td>
<td>9th</td>
<td>12</td>
<td>207.76</td>
<td>203.64</td>
<td>No</td>
<td>-0.33</td>
</tr>
<tr>
<td>Crystal Island</td>
<td>8th</td>
<td>492</td>
<td>222.83</td>
<td>220.81</td>
<td>Yes</td>
<td>-0.14</td>
</tr>
<tr>
<td>DaVinci Minds Inc.</td>
<td>6th</td>
<td>58</td>
<td>239.55</td>
<td>240.01</td>
<td>Yes</td>
<td>-0.06</td>
</tr>
<tr>
<td></td>
<td>7th</td>
<td>6</td>
<td>218.26</td>
<td>220.28</td>
<td>No</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td>8th</td>
<td>2</td>
<td>230.18</td>
<td>228.75</td>
<td>No</td>
<td>-0.11</td>
</tr>
</tbody>
</table>

Note: Grade levels for which there were fewer than 30 students were not used in the meta-analysis.

**Comparing Results from VCG and ANG Analyses**
Because the VCG gains are computed from NWEA’s Growth Research Database of students tested during the 2011-12 school year, the distribution of VCG scores can be compared with the data in the norms tables. Table B-5 compares the effect size estimates for Classroom Inc. grades 8 and 9 using the two methods. The two methods yield different results. We suspect that the VCG methodology is less biased that the ANG method but in both cases we note limitations.

**Table B-5. Classroom Inc. Data Used for VCG Analyses**

<table>
<thead>
<tr>
<th>Grade</th>
<th>VCG Effect Size</th>
<th>ANG Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>-0.44</td>
<td>-0.60</td>
</tr>
<tr>
<td>9</td>
<td>-0.26</td>
<td>-0.33</td>
</tr>
</tbody>
</table>
Limitations of MAP VCG and ANG Analyses

Although these analyses can provide evidence on the relative performance of the Wave II schools in the analysis, several factors limit the claims that can be made about the direct relationship between the Wave II project solutions and improved test scores. The primary limitation of the VCG design is that we did not have access to VCG comparison data from prior years for the schools. Thus, we did not know the extent to which a relative difference in spring 2012 or 2013 test scores is a result of the introduction of the Wave II project solution rather than a preexisting difference in performance between the schools implementing Wave II and the schools in the VCG. Also, little is known about the schools that students in the VCG attended and the instructional programs they experienced. Therefore, any important existing differences between schools in the study and schools in the VCG that might affect test scores are unknown. All that is known is that the schools served similar compositions of students based on the percentage eligible for the federal free or reduced-price lunch program and administered the MAP assessment during the same test windows. Students in the VCG may have been in schools undergoing instructional reform and integrating technology into their instruction.

Caution should be used when drawing conclusions from either of these analytic methods for the following reasons:

1. **Measurement error and normed growth.** The measurement error associated with each individual student score was an indicator of the possible range of scores a student could reasonably score if the test were taken again (within a few days). Thus, for a grade 8 student who scored an overall RIT of 196, the standard error was 3.5, meaning that the true score can be expected to lie in the range of 192.5 to 199.5. Some results have fairly large standard errors; any results with error bars that cross zero could be due to a combination of sampling and measurement error.

2. **Instructional time (actual with intervention) relative to test interval.** The minimum time between tests for formation of a VCG is 10 weeks (approximately 50 hours of instruction). Most of the projects in Wave II provided much less than 50 hours of instruction. Thus, the treatment group’s change in performance between pre- and post-test may reflect other instruction besides that involving the Wave II solution. With ANG analysis, the empirical data showed that students tested near the end of school year demonstrated growth but less positive growth than the normed group. All students whose scores were used in these Wave II analyses took their posttests at the end of the school year.

3. **Conditions in the comparison groups.** In the AN analysis, the students in the treatment were compared with a national sample of students with similar pretest scores at the same week in the school year. No other controls (such as type of school attended or an individual student’s poverty level, ethnicity, or gender) were used. In the VCG formation, urbanicity and the proportion of students eligible for free or reduced-price lunch at the student’s school were
controlled for, but the only student-level variable controlled for, other than pretest scores, was grade.
Alignment with Common Core State Standards

This section summarizes the alignment between the Common Core State Standards, Wave II solution content, and selected standardized assessments. Table B-6 summarizes three alignment dimensions:

- Whether the project-developed content specifically addressed Common Core State Standards in either English language arts or mathematics
- Whether the project-developed content was well-aligned with the project-supplied learning measure
- Whether the content was aligned with the NWEA MAP (Massachusetts State version ELA or math). The Massachusetts version of MAP is the version identified by NWEA as best aligned with the Common Core Standards. It was not designed to be a CCSS assessment, but it was regarded in 2010–11 as the best fit available.
## Table B-6. Alignment of Standardized Assessment Data

<table>
<thead>
<tr>
<th>Grantee</th>
<th>Measure</th>
<th>Content Aligned with CCSS ELA or Math*</th>
<th>Content Aligned with Project-Developed Measure*</th>
<th>Content Aligned with NWEA MAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAST, Inc.</td>
<td>MCAS (ELA &amp; Physics)</td>
<td>⬤</td>
<td>⬤</td>
<td>NA</td>
</tr>
<tr>
<td>Classroom, Inc.</td>
<td>MAP - MA state version, ELA - Reading</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>DaVinci Minds, Inc.</td>
<td>MAP - MA State version, Math</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>EDC</td>
<td>None</td>
<td>⬤</td>
<td>⬤</td>
<td>NA</td>
</tr>
<tr>
<td>Ednovo</td>
<td>MAP - MA State version, Math</td>
<td>Addressed by some of the resources but depends on which resources chosen</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>Hofstra University</td>
<td>STAR Enterprise (Math)</td>
<td>⬤</td>
<td>⬤</td>
<td>NA</td>
</tr>
<tr>
<td>iCivics</td>
<td>Project developed</td>
<td>⬤</td>
<td>⬤</td>
<td>NA</td>
</tr>
<tr>
<td>Imagine Education</td>
<td>Project developed (Math)</td>
<td>⬤</td>
<td>⬤</td>
<td>NA</td>
</tr>
<tr>
<td>Louisiana DOE</td>
<td>MAP - MA State version, Math</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>MIT</td>
<td>None</td>
<td>⬤</td>
<td>⬤</td>
<td>NA</td>
</tr>
<tr>
<td>North Carolina State University</td>
<td>MAP - MA State version, ELA - Reading</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>LearnZillion (Scholar Rocket Inc.)</td>
<td>None</td>
<td>⬤</td>
<td>⬤</td>
<td>NA</td>
</tr>
<tr>
<td>SMALLab Learning, LLC</td>
<td>MAP - IL State version, Science</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>Texas Tech University</td>
<td>MAP - MA State version, Math</td>
<td>⬤</td>
<td>⬤</td>
<td>NA</td>
</tr>
<tr>
<td>University of Massachusetts, Amherst</td>
<td>MCAS/MAP - MA State version, Math</td>
<td>⬤</td>
<td>⬤</td>
<td>NA</td>
</tr>
<tr>
<td>University of South Florida, St. Petersburg</td>
<td>FCAT (Math)</td>
<td>⬤</td>
<td>⬤</td>
<td>NA</td>
</tr>
<tr>
<td>University of Wisconsin, Madison</td>
<td>MAP - WI State version, ELA - Reading</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
</tbody>
</table>

### Notes:
- ⬤: Partially aligned
- ⬤: Fully aligned
- ⬤: Not aligned
What follows is a deeper investigation of the alignment of each Wave II project with the standardized measure selected using the Common Core Standards as the reference.

**CCSS English Language Arts – Literacy in History/Social Studies, Science, and Technical Subjects**

CCSS English Language Arts College and Career Readiness anchors are provided for subareas for grades 6–12. This discussion concerns only the general literacy portion of the standards and does not expand on the Writing or Speaking and Listening anchors. Wave II grant projects that addresses ELA standards mostly focused on the reading of Informational Text (rather than literature); only one project (iCivics) included writing as part of its focus. iCivics used a previously released item from the California Writing Standards Test in Grade Seven (October 2008) to assess student achievement on a persuasive writing task. The assessment was both closely aligned with the project solution and a subset of the ELA CCSS that address persuasive writing. For this project, we did not consider the assessment overly aligned with the intervention from the standpoint that the writing prompt was drawn from a standardized test that had been given to students across a large state, not just to students experiencing iCivics.

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5 Description of standards is from Common Core State Standards Initiative documents published June 2, 2010; downloaded from [http://www.corestandards.org/the-standards](http://www.corestandards.org/the-standards)

Table B-7 lists the Wave II projects using NWEA MAP ELA-Reading to determine impact on student achievement.

### Table B-7. Alignment with CCSS and NWEA MAP English Language Arts - Reading

<table>
<thead>
<tr>
<th>Grant Project (alignment rating)</th>
<th>Outcomes Targeting</th>
<th>CCSS Standards Addressed</th>
<th>Matching MAP Goal Areas (subscases)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom Inc. – The Sports Network 2 <em>(somewhat aligned)</em></td>
<td>Comprehend and respond to workplace-oriented texts</td>
<td>Reading Standards for Informational Text, Grade 8: RI.1–RI.4</td>
<td>Language, vocabulary &amp; reading (#1)</td>
<td>Understanding text: Informational/expository (#3)</td>
</tr>
<tr>
<td>North Carolina State University – Crystal Island <em>(slightly aligned)</em></td>
<td>Science literacy &amp; problem solving in microbiology context</td>
<td>Reading Standards for Informational Text, Grade 8: RI.1, RI.4, RI.5, &amp; RI.7</td>
<td>Language, vocabulary &amp; reading (#1)</td>
<td>Understanding text: Informational/expository (#3)</td>
</tr>
<tr>
<td>University of Wisconsin, Madison – CoMPASS Physics <em>(slightly aligned)</em></td>
<td>Science literacy in areas of force &amp; motion and mass &amp; energy</td>
<td>Reading Standards for Informational Text, Grades 6–8: RI.1, RI.4, RI.5, &amp; RI.7</td>
<td>Determine the meaning of words and phrases in context (#1)</td>
<td>Understand and analyze text (#2 &amp; 3)</td>
</tr>
</tbody>
</table>

### Key Ideas and Details in CCSS for Reading Informational Text

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

### Craft and Structure

4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

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5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
6. Assess how point of view or purpose shapes the content and style of a text.

Integration of Knowledge and Ideas
7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.
8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

Range of Reading and Level of Text Complexity
10. Read and comprehend complex literary and informational texts independently and proficiently.

CCSS Mathematics

The CCSS Math Standards specify eight dimensions of mathematical practice:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

These eight dimensions are then applied to grade-level-specific topic areas. For the middle grades (6–9), they are grouped as follows.

Common to all grades (6–9):
- Geometry (G)
- Statistics and Probability (SP)

Common to grades 6 & 7 only:
- Ratios and Proportional Relationships (RP)

Description of standards is taken from Common Core State Standards Initiative documents published June 2010; downloaded from http://www.corestandards.org/the-standards
Common to grades 6–8:
  • The Number System (NS)
  • Expressions and Equations (EE)

Common to grades 8 and 9 only:
  • Functions (F)

Grades 9 and above change topical focus to include:
  • Number and Quantity
  • Algebra
  • Modeling

Within each of these areas are subtopic areas reflecting the expanded expectations of mathematical knowledge at the high school level. Table B-8 summarizes the targeted outcomes, standards addressed, and most relevant MAP subscales for Wave II projects addressing the CCSS in mathematics and measuring impact using NWEA MAP. Tables B-9 and B-10 provide comparable information for the other standardized or state assessments being used by Wave II math projects.
Table B-8. Alignment with CCSS and NWEA MAP Math

<table>
<thead>
<tr>
<th>Grant Project (alignment rating)</th>
<th>Outcomes Targeting</th>
<th>CCSS Standards Addressed</th>
<th>Matching MAP Goal Areas (subscales)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>DaVinci Minds, Inc. – WhyCareers (somewhat aligned)</td>
<td>Learn math &amp; science by interacting with complex problems related to the power grid</td>
<td>Grade 7: EE.3, EE.4, RP.1</td>
<td>Numbers and Operations</td>
<td></td>
</tr>
<tr>
<td>EdNovo – Gooru (slightly aligned)</td>
<td>Math &amp; Science homework support &amp; resources</td>
<td>Depends on teacher needs and implementation</td>
<td>Alignment cannot be characterized</td>
<td>Achievement Network partners are trying to identify equivalent assessments.</td>
</tr>
<tr>
<td>Louisiana DOE – Online Algebra (slightly aligned)</td>
<td>Statistics, data, and probability modules</td>
<td>Grade 9: S.ID1.1 through S.ID.9</td>
<td>Statistics and Probability</td>
<td>There are some CCSS not addressed by MAP.</td>
</tr>
<tr>
<td>University of Massachusetts, Amherst – Wayang Outpost (Well-aligned)</td>
<td>Math skills</td>
<td>Math Standards, Grade 7 - 9: 1 through 8</td>
<td>All 5 goal areas</td>
<td>There may be specific CCSS that are not addressed.</td>
</tr>
<tr>
<td>WNET – Get the Math! (somewhat aligned)</td>
<td>Math skills</td>
<td>Grade 9: all</td>
<td>Patterns, relations, algebra, and functions Quantitative Relationships</td>
<td>NJ State version is not aligned specifically with CCSS. There may be specific CCSS that are not addressed.</td>
</tr>
<tr>
<td>Worcester Polytechnic Institute – ASSISTments (somewhat aligned)</td>
<td>Math skills</td>
<td>Depends on teacher implementation</td>
<td>Patterns, relations, algebra, and functions Quantitative Relationships</td>
<td>ME State version is not aligned specifically with CCSS. There may be specific CCSS that are not addressed.</td>
</tr>
</tbody>
</table>

Hofstra University took advantage of a measure already used district-wide to determine student mathematical progress in geometry. The STAR Enterprise assessment (http://www.renlearn.com/sm/) is used most frequently in a Response to Intervention instructional framework. The assessment was given to all students every month for 4 months. STAR math has four subareas: Numbers & Operations, Algebra, Geometry & Measurement, and Data Analysis, Statistics & Probability.
Table B-9. Alignment with CCSS and STAR Enterprise Mathematics

<table>
<thead>
<tr>
<th>Grant Project (alignment rating)</th>
<th>Outcomes Targeting</th>
<th>CCSS Standards Addressed</th>
<th>Matching STAR Areas (subscales)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hofstra - WISEngineering (somewhat aligned)</td>
<td>Mathematics (geometry) through design and engineering</td>
<td>Grade 7: G.1 – G.6</td>
<td>Geometry &amp; Measurement</td>
<td>Only one subscale directly addresses the goals, but portions of the Number &amp; Operations also are potential targets.</td>
</tr>
</tbody>
</table>

Two projects elected to use the state assessments used by the school district rather than add an additional assessment burden.

Table B-10. Alignment with CCSS and Various State Assessments

<table>
<thead>
<tr>
<th>Grant Project (alignment rating)</th>
<th>Outcomes Targeting</th>
<th>CCSS Standards Addressed</th>
<th>Possible Areas of Alignment</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>USF, St. Petersburg – SunBay Mathematics (well-aligned)</td>
<td>Ratios &amp; proportions, expressions &amp; equations, geometric figures: congruence &amp; similarity functions</td>
<td>Grades 6 through 8:</td>
<td>Well aligned with posttest but previous years’ scores are not testing the same standards.</td>
<td>Florida, FCAT 2.0 was released for use in 2011 - 2012 school year aligned to CCSS, prior version of FCAT measured state standards</td>
</tr>
</tbody>
</table>
**MAP Science**

The CCSS do not include science. The recently released Next Generation Science Standards were not available at the time of the Wave II projects’ inception. Nevertheless, one Wave II project, SMALLab Learning, targeted content related to science, drawing from the National Research Council’s *Science Education Framework* (Table B-11). They used the MAP science assessment as its learning outcome.

### Table B-11. Alignment with CCSS and NWEA MAP Science

<table>
<thead>
<tr>
<th>Grant Project (alignment rating)</th>
<th>Outcomes Targeting</th>
<th>CCSS Standards Addressed</th>
<th>Matching MAP Goal Areas (subscales)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMALLab Learning, LLC – Simple Machines EIW (slightly aligned)</td>
<td>Science concepts such as force and motion</td>
<td>CCSS does not include science.</td>
<td>Alignment cannot be characterized yet.</td>
<td>Illinois State version</td>
</tr>
</tbody>
</table>
Descriptive Data from the Teacher Survey

The population for the teacher survey was educators who had experience using an NGLC Wave II solution with students by May 2012 (for the first survey administration) or by April 2013 (for the second survey administration) and who agreed to participate in the evaluation of the individual project. Data were collected in two rounds to accommodate those projects that implemented their solution during the 2012–13 academic year). Each principal investigator was asked to provide names and contact information for educators meeting the survey participation criteria. Of the 19 grant projects that had started solution implementation by the time of the teacher survey, two (MIT and WNET) could not provide educator names or contact information because of conditions set by IRBs. For these two projects, we recruited teacher respondents using district-level contacts to disseminate a flyer to educators working with their projects’ solutions.

The project implementations varied in size from a single teacher with several classes to several hundred teachers. Two projects (MIT and LearnZillion) were so large that we limited the survey respondent pool for cost efficiency. In all other cases, we sought to include all potential respondents in the survey. Table B-12 shows the respondent pool by grant project.

Table B-12. Number of Teacher Survey Respondents, by Project

<table>
<thead>
<tr>
<th>Grantee (Project)</th>
<th>Number of Respondents</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAST</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Classroom, Inc..</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>DaVinci Minds</td>
<td>14</td>
<td>17</td>
</tr>
<tr>
<td>EDC</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>EdNovo</td>
<td>*5</td>
<td>*6</td>
</tr>
<tr>
<td>Hofstra</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>iCivics</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Imagine Ed</td>
<td>19</td>
<td>21</td>
</tr>
<tr>
<td>LVS</td>
<td>*15</td>
<td>*22</td>
</tr>
<tr>
<td>MIT</td>
<td>45</td>
<td>50 (**1,300+)</td>
</tr>
<tr>
<td>NCSU</td>
<td>31</td>
<td>34</td>
</tr>
<tr>
<td>LearnZillion</td>
<td>*23</td>
<td>*62 (**10,000+)</td>
</tr>
</tbody>
</table>

In some cases, grant projects served many more teachers and students than are reflected in the survey pool. For example, WPI served more teachers than the 12 named as potential respondents, but these were the teachers who agreed to participate in the overall research conducted by WPI and who participated in the NWEA MAP data collection.
SRI invited 306 educators to complete the teacher survey, and 235 responded. Of these, 17 had not yet implemented the Wave II solution with students or said that they were not involved at all. These educators were removed from the sample, producing a final sample for the 19 projects of 218 educators who had used a Wave II solution with students by June 2013. The overall survey response rate was 77% (The Year 1 response rate was 89%, and the Year 2 response rate was 49%). We attribute the significant difference in between Year 1 and Year 2 response rates to the selection process used to identify LearnZillion teachers.

Because the LearnZillion project served more than 13,000 teachers, we used a random selection process from among the registered users who indicated that they had used the pre/post assessment tools with their students (approximately 500). From those, we randomly selected 62 participants. Unfortunately, we had limited contact information on these participants and could not do any follow-up through additional channels in the way we did with teachers from other projects who did not respond initially.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Year 1</th>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMALLab</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Texas Tech</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>UMass</td>
<td>7 (*1)</td>
<td>10 (*1)</td>
</tr>
<tr>
<td>USFSP</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>UWisc</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>WNET</td>
<td>4</td>
<td>5 (**12)</td>
</tr>
<tr>
<td>WPI</td>
<td>9</td>
<td>12</td>
</tr>
</tbody>
</table>

* Data collected in 2013.
** The respondent pool was larger, but only a subset of the total volunteered/were selected.