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SEDL

Rapid Response REQUEST

# Studies of Mathematics Software Products

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| **Date** | May 25, 2011 |
| **Number** | 00109 |
| **Request** | A state department of education served by the Southeast Comprehensive Center (SECC) at SEDL requested information regarding the use of MyMathLab and similar math software products (i.e., PLATO Achieve Now, ALEKS, Math in Focus, and others). The client is specifically interested in obtaining information on the effectiveness of math software products in practice. |
| **Summary** | In response to this request, SECC staff conducted web-based and hand searches of literature and other resources to obtain information on the topic. The staff selected for inclusion in this report mathematics software products based on the following criteria:<br>• Specific products that were requested by the client<br>• Products with studies available that were evaluated in accordance with the What Works Clearinghouse (WWC) evidence review protocol for elementary school mathematics interventions (WWC, 2009d) and evidence review protocol for middle school mathematics interventions (WWC, 2009e)<br>• Products for which studies have been published in peer-reviewed journals and in other publications |

## SUMMARY OF SEARCH EFFORTS

SECC staff members obtained information on a number of mathematics software studies which are discussed below. However, staff were unable to locate research studies on MyMathLab or Math in Focus.

According to the Pearson Education Web site, "MyMathLab is a series of online courses that accompany Pearson's textbooks in mathematics and statistics. Since 2001, MyMathLab—along with MyStatLab and MathXL, have helped over 9 million students succeed at more than 1,900 colleges and universities." Promotional information indicates that the MyMathLab suite of products focuses on higher education math instruction.

Houghton Mifflin Harcourt's Web site states that, "Math in Focus: The Singapore Approach is Singapore math for U.S. classrooms," It also states that the software offers Singapore math pedagogy with fewer topics taught in greater depth at each grade level. In addition, the product is said to feature visual representations and modeling strategies to solve complex problems; a consistent concrete-pictorial-abstract progression; as well as strong development of both conceptual understanding, place value, and computational fluency.

SECC staff members were successful in locating studies on the following math software products: Accelerated Math, Assessment and Learning in Knowledge Spaces (ALEKS), Destination Math, DreamBox Learning, Odyssey Math, PLATO Achieve Now, SuccessMaker, and YearlyProgress Pro. Refer to Table 1, Studies of Mathematics Software Products, for detailed information. The table provides product descriptions as well as summaries of software product studies, reviews of studies, study results, and evidence of effectiveness (if indicated or determinable).



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## LIMITATIONS OF THIS RAPID RESPONSE REPORT

The goal of this report is to provide decision makers and other stakeholders with information on studies of mathematics software products that would enable them to compare various products and their potential efficacy.

The selected information featured in this report is not inclusive of all available resources on the topic of studies of mathematics software products. Furthermore, SECC does not recommend or endorse any products, programs, or curriculums discussed in this report.

## REFERENCES

Coalition for Evidence-Based Policy. (2003). *Identifying and implementing educational practices supported by rigorous evidence: A user friendly guide (NCEE EB2003).* Washington, DC: U.S. Department of Education Institute of Education Sciences. Retrieved from http://ies.ed.gov/pubsearch/pubsinfo.asp?pubid=NCEEEB2003

CTB/McGraw-Hill LLC. (2008). *Yearly ProgressPro research synopsis.* Monterey, CA: The McGraw-Hill Companies Inc.

Fine, A., Duggan, M., & Braddy, L. (2009). Removing remediation requirements: Effectiveness of intervention programs. *PRIMUS, 19*(5), 433–446. Retrieved from http://www.informaworld.com/smpp/ftinterface~db=all~content=a914493045~fulltext=713240930

Gatti Evaluation, Inc. (2010). *SuccessMaker® Mathematics: Evidence of effectiveness.* Pittsburgh, PA: Author. Retrieved from http://www.pearsonschool.com/live/images/custom/smdemo/pdf/SMR1_Math_Pilot_Study_Overview_FINAL.pdf

Jorgensen, M. (2010). *Results from the DreamBox Learning grade 2 assessment study.* Bellevue, WA: Harcourt. Retrieved from http://www.dreambox.com/downloads/pdf/DreamBox_Results_from_the_Grade_2_Study.pdf

Kariuki, P., & Gentry, C. (2010, November). *The effects of Accelerated Math utilization on grade equivalency score at a selected elementary school.* Paper presented at the Annual Meeting of the Mid-South Educational Research Association, Mobile, AL. Retrieved from http://www.eric.ed.gov/PDFS/ED513432.pdf

Sivin-kachala, j., & bialo, e. (2007). *Research on the NYC SIFE-Destination Math program.* New York, NY: Interactive Educational Systems Design Inc. Retrieved from http://www.hmhinnovation.com/downloads/Research/NYC_SIFE_Abstract.pdf

What Works Clearinghouse. (2008). *Accelerated Math. What Works Clearinghouse intervention report.* Princeton, NJ: Author. Retrieved from http://ies.ed.gov/ncee/wwc/reports/middle_math/accel_math/

What Works Clearinghouse. (2009a). *Destination Math. U.S. What Works Clearinghouse intervention report.* Princeton, NJ: Author. Retrieved from http://ies.ed.gov/ncee/wwc/reports/middle_math/destination_math/index.asp

What Works Clearinghouse. (2009b). *Odyssey Math. What Works Clearinghouse intervention report.* Princeton, NJ: Author. Retrieved from http://ies.ed.gov/ncee/wwc/pdf/wwc_odysseymath_081809.pdf

What Works Clearinghouse. (2009c). *Odyssey Math. What Works Clearinghouse intervention report.* Princeton, NJ: Author. Retrieved from http://ies.ed.gov/ncee/wwc/pdf/wwc_odysseymath_102108.pdf

What Works Clearinghouse. (2009d). *WWC evidence review protocol for elementary school mathematics interventions, version 1.0.* Princeton, NJ: Author. Retrieved from http://ies.ed.gov/ncee/wwc/pdf/esm_protocol_1.0.pdf

What Works Clearinghouse. (2009e). *WWC evidence review protocol for middle school mathematics interventions,*

*version 1.0*. Princeton, NJ: Author. Retrieved from http://ies.ed.gov/ncee/wwc/PDF/msm_protocol_1.0.pdf

What Works Clearinghouse. (2010). *Accelerated Math. What Works Clearinghouse intervention report.* Princeton, NJ: Author. Retrieved from http://ies.ed.gov/ncee/wwc/reports/elementary_math/accel_math/index.asp

What Works Clearinghouse. (2010). *PLATO Achieve Now. What Works Clearinghouse intervention report.* Princeton, NJ: Author. Retrieved from http://ies.ed.gov/ncee/wwc/reports/middle_math/plato/

Wijekumar, K., Hitchcock, J., Turner, H., Lei, P. W., & Peck, K. (2009). *A multisite cluster randomized trial of the effects of CompassLearning Odyssey Math on the math achievement of selected grade 4 students in the Mid-Atlantic Region. Final report. NCEE 2009-4068.* Jessup, MD: National Center for Education Evaluation and Regional Assistance. Retrieved from http://www.eric.ed.gov/PDFS/ED507314.pdf

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| Table 1. Studies of Mathematics Software Products | | |
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| **Product Description** | **Description of Study, Summary of Results, *Evidence of Effectiveness** | **Resource** |
| **Title:** Accelerated Math<br><br>**Description:** Accelerated Math is a computerized, personalized practice and progress-monitoring tool for students in grades K–12 that helps educators manage classroom tasks by producing daily, personalized math practice for students, scoring student work, and reporting results immediately. It automatically keeps records of student work and gives progress-monitoring information each day. Renaissance Learning publishes this product. | **Study Description:** The Effects Of Accelerated Math Utilization On Grade Equivalency Score At A Selected Elementary School<br><br>The purpose of this study was to examine the effects of Accelerated Math utilization on students' grade equivalency scores. Twelve students for both experimental and control groups were randomly selected from 37 students enrolled in math in grades four through six. The experimental group consisted of the students who actively participated in the Accelerated Math program. The control group consisted of the students who did not participate in Accelerated Math. Data were collected from the reports generated from the Accelerated Math program and from the STAR Math program. The STAR Math testing reports were used to determine the grade equivalency for each student in both experimental and control groups. Data were analyzed using independent t-test using 0.05 level of significance.<br><br>**Summary of Results:**<br>The results indicated a significant difference between experimental and control groups' grade equivalency scores. The experimental group showed greater increase in grade equivalence score than the control group. No significant difference was found in number operation proficiency. The results suggest that the use of the Accelerated Math program combined with regular classroom instruction increases the students' grade equivalency scores.<br><br>**Evidence of Effectiveness:** None or Unknown | Kariuki, P., and Gentry, C. (2010, November) |
| | **Study Description:** Accelerated Math. What Works Clearinghouse Intervention Report<br><br>Thirty-eight studies in this review assess the effectiveness of Accelerated Math as part of a school's core math curriculum.<br><br>**Summary of Results:**<br>None of the studies reviewed meet WWC evidence standards; three meet WWC evidence standards with reservations; the remaining 35 studies do not meet either WWC evidence standards or eligibility screens. Based on the three studies, WWC found no discernible effects in math achievement. The conclusions presented in this report may change as new research emerges. Five appendixes are included: (1) Study Characteristics; (2) Outcome measures for the math achievement domain; (3) Summary of study findings included in the rating for the math achievement domain; (4) Accelerated Math rating for the math achievement domain; and (5) Extent of evidence by domain. (Contains 9 footnotes.)<br><br>**Evidence of Effectiveness:** None or Unknown | What Works Clearinghouse (2008) |

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| **Product Description** | **Description of Study, Summary of Results, *Evidence of Effectiveness** | **Resource** |
| | **Study Description:** Accelerated Math. What Works Clearinghouse Intervention Report<br><br>WWC reviewed 32 studies on Accelerated Math to determine evidence of effectiveness for math achievement for elementary school students.<br><br>**Summary of Results:**<br>One of the studies reviewed meets WWC evidence standards; two meet WWC evidence standards with reservations; the remaining 29 studies do not meet either WWC evidence standards or eligibility screens. WWC found mixed effects in math achievement for elementary school students. The conclusions presented in this report may change as new research emerges. Appendices include (1) Study characteristics; (2) Outcome measures for the math achievement domain; (3) Summary of study findings included in the rating for the math achievement domain; (4) Accelerated Math rating for the math achievement domain; and (5) Extent of evidence by domain. (Contains 10 footnotes.)<br><br>**Evidence of Effectiveness:** Possible | What Works Clearinghouse (2010) |
| **Title:** Assessment and Learning in Knowledge Spaces (ALEKS)<br><br>**Description:** ALEKS is a web-based, artificially intelligent assessment and learning system. ALEKS was developed by a team of software engineers, mathematicians, and cognitive scientists with the support of a grant from the National Science Foundation. It is an artificial intelligence engine that assesses each student individually and continuously and is based upon original theoretical work in a field of study called Knowledge Space Theory. As an assessment tool, ALEKS uses adaptive questioning to assess a student's current math knowledge and determines which topics have been mastered and which topics have not. ALEKS can then be used for highly targeted, individualized instruction from any computer with Internet access. ALEKS continues to periodically reassess the student to ensure that topics are learned. | **Study Description:** Removing Remediation Requirements: Effectiveness of Intervention Programs<br><br>This study compared the effectiveness of high school mathematics courses utilizing an artificial intelligence-based learning system (ALEKS) with non-ALEKS-based mathematics courses or no mathematics course in removing remediation requirements for college-bound high school seniors.<br><br>**Summary of Results:**<br>Results suggest that the ALEKS program may provide an alternative for some students to remove their college mathematics remediation requirements while still in high school.<br><br>**Evidence of Effectiveness:** Unknown<br>The study was not a randomized controlled trial and would not meet the standards to be considered a strong scientifically based research study | Fine, A., Duggan, M., and Braddy, L. (2009) |

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| **Title:** Destination Math<br><br>**Description:** Destination Math is a series of computer-based curricula designed to be used for at least 90 minutes a week. Featuring sequenced, prescriptive, step-by-step instruction, Destination Math is designed for the development of fluency in critical skills, math reasoning, conceptual understanding, and problem-solving skills. Intermediate Math (grades 4–6), Advanced Math (6–8), Pre-Algebra (6–8), and Algebra (9–12) are available for middle school students. Houghton Mifflin Harcourt publishes this product. | **Study Description:** Destination Math. U.S. What Works Clearinghouse Intervention Report<br><br>WWC reviewed 11 studies of Destination Math. None of the studies that fall within the scope of the middle school math review protocol meet WWC evidence standards. The lack of studies meeting WWC evidence standards means that, at this time, WWC is unable to draw any conclusions based on research about the effectiveness or ineffectiveness of Destination Math.<br><br>**Summary of Results:**<br>Eleven studies of Destination Math were published or released between 1982 and 2008. One study is within the scope of the review and has an eligible design but does not meet WWC evidence standards. However, the study does not establish that the comparison group was comparable to the treatment group prior to the start of the intervention. Six studies are out of the scope of the review because they have an ineligible study design that does not meet WWC evidence standards; specifically, the studies do not include a comparison group. Four studies are out of the scope of the review, as defined by the middle school math protocol, for reasons other than study design.<br><br>**Evidence of Effectiveness:** Unknown<br><br>Of the 11 identified studies of Destination Math, none fall within the scope of the middle school math review protocol of WWC evidence standards. | What Works Clearinghouse (2009a) |
| | **Study Description:** Research on the NYC SIFE-Destination Math Program<br><br>An analysis of achievement and implementation data from the New York City Board of Education's Students with Interrupted Formal Education (SIFE) grant program for English learners (ELs) was completed in May 2007. This program included the use of Destination Math technology-based courseware in before- and after-school programs at 13 NYC school sites during the Spring 2007 semester.<br><br>**Summary of Results:**<br>*Findings from quantitative data:* There was a statistically significant improvement in mathematics skills from pre-test to post-test for all students for those who completed Destination Math benchmark assessments in either Spanish or English. The use of Destination Math in regular classroom instruction—in addition to its use before and after school—had a major positive impact on students' math achievement.<br><br>*Findings from qualitative data:* Based on data from teacher logs, surveys, and interviews, the Destination Math SIFE project manager and IESD analysts concluded the following: the vast majority of the teachers for whom data were collected (94%) reported assigning math journal writing on a regular basis. About two-thirds of the teachers for whom data was collected (65%) reported assigning Destination Math print activities on a regular basis. These activity sheets feature skill-building and application items in a combination of fill-in, multiple choice, and brief constructed response formats. | Sivin-kachala, j., and bialo, e. (2007) |

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| | All but one of the teachers for whom data was collected (97%) reported holding individual student-teacher miniconferences during every SIFE session—while the other students worked independently. During these miniconferences, students were able to identify areas where they needed help and to exchange ideas with their teachers while they reviewed their math journals and Destination Math activity sheets. The conferences fostered learning in a nonthreatening environment. This collaborative learning forum increased students' mathematical understanding as well as helped to build key literacy skills.<br><br>Based on the findings summarized above, IESD researchers conclude the following: the SIFE Destination Math program is an effective instructional solution for EL students with interrupted formal education. The findings presented here are preliminary and tentative, based mostly on an instructional treatment group-only, pre-test/post-test research design—a design that cannot establish a causal relationship between student experience with Destination Math and math achievement gains.<br><br>IESD recommends continuing the program and, if feasible, conducting comparison group research (e.g., with randomized assignment of students or at least matching of student groups by prior math and language ability). There is preliminary evidence that the impact of the SIFE Destination Math program can be maximized by the following: using Destination Math in regular classroom instruction—in addition to its use before or after school; having teachers assign math journal writing on a regular basis; having teachers regularly assign Destination Math print activities; and, having teachers hold individual student-teacher miniconferences on a regular basis.<br><br>**Evidence of Effectiveness:** Unknown | |
| **Title:** DreamBox Learning<br><br>**Description:** DreamBox Learning K–3 Math provides individual math instruction. The online learning program lets students work independently in their optimal learning zone. DreamBox Learning's math curriculum builds conceptual understanding and fluency in the critical areas of number and operations, place value, and number sense. Integrated instruction and assessment, and detailed reporting, gives teachers and administrators actionable data on comprehension, proficiency, and effectiveness. DreamBox Learning publishes this product. | **Study Description:** Results from the DreamBox Learning Grade 2 Assessment Study<br><br>This study focused on second grade students who volunteered to participate in a pilot implementation of the DreamBox Learning instructional product, DreamBox Learning K–2 Math. Twenty-seven second grade students participated in a study to examine the effectiveness of the DreamBox technology on mathematics learning over a 2-week period. Students were given a paper-and-pencil pre-test on the first day of the DreamBox after-school program. They were then given a parallel post-test on the last day of the DreamBox after-school program. The results were analyzed using a paired-sample or dependent t-test, and the results were found to be statistically significant with an average improvement in test scores.<br><br>**Summary of Results:**<br>Of the 27 students who participated, 15 were females and 12 were males. No independent analyses were conducted by gender because of the small samples.<br><br>The average (mean) pre-test for the group was 10.57 out of 20 points possible. The standard deviation for the pre-test was 3.95. The mean for the post-test was 12.54 with a standard deviation of 4.09. | Jorgensen, M. (2010) |

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| | Using a paired-sample (or dependent) t-test, the improvement in test scores (positive difference between pre- and post-test performance) for this group of second grade students was significant at the $p<.05$ level.<br><br>Of the total 10 hours, 2 hours were used for the pre- and post-assessment administration and approximately 1 hour for daily attendance, snack time, and talking with the teachers who were monitoring the classrooms. During the remaining 7 hours, approximately 3 hours were used logged into the technology tool but not actively engaged in learning. During these 3 hours, students were exploring the technology, selecting an avatar, and playing games within the technology. Students were engaged in learning activities specifically for an average of 4 hours over the 2-week pilot study.<br><br>The improvement in test scores results were achieved after an average of 4 hours total engaged in the instructional components of DreamBox Learning K–2 Math. Another way to report this is that there was a 19% increase in average score on the assessment after only an average of 4 hours of incremental instruction. Using regression to determine the incremental improvement on total test scores given 1 hour in the DreamBox instructional technology indicates that, on the average, a student's score is likely to improve by approximately .4 points.<br><br>**Evidence of Effectiveness:** None or Unknown | |
| **Title:** Odyssey Math<br><br>**Description:** Odyssey Math is a web-based K–12 mathematics curriculum and assessment tool designed to allow for instructional differentiation and data-driven decision making. The online program includes electronic curriculum and materials for individual or small group work, assessments aligned with state curriculum standards, and a data management system that allows teachers to develop individualized instructional and assessment tools, as well as track individual and classroom student performance. Odyssey Math can be used as a standalone curriculum or as a supplement to other mathematics curriculum. The primary school version of the Odyssey Math curriculum focuses on fundamental math skills like numeracy for the earlier grades, while in later grades, the curriculum equips students for skills necessary in middle and high school mathematics. | **Study Description:** Odyssey Math. What Works Clearinghouse Intervention Report (August 2009)<br><br>The study focused primarily on the relationship between Odyssey Math usage (in the treatment group) and student achievement, but the author also examined outcome differences of the treatment and control groups. The original randomly assigned sample included 13 classrooms (7 treatment and 6 control) in five schools. A single magnet school with two comparison classrooms was dropped from the analysis because the school's demographic composition was significantly different from the other schools in the sample.<br><br>**Summary of Results:**<br>WWC reviewed 14 studies of Odyssey Math. One of these studies meets WWC evidence standards with reservations. The remaining 13 studies do not meet either WWC evidence standards or eligibility screens. Based on the one study, WWC found potentially positive effects in math achievement. The conclusions presented in this report may change as new research emerges. Five appendices include (1) Study characteristics; (2) Outcome measures; (3) Summary of study findings; (4) Rating; and (5) Extent of evidence. (Contains 10 footnotes. Appendices are footnoted individually.)<br><br>**Evidence of Effectiveness:** Possible | What Works Clearinghouse (2009b) and (2009c) |

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| The interactive activities used for both age groups allow for the application of ideas, tools, and manipulatives, and build upon previous knowledge. CompassLearning publishes this product. | **Study Description:** Odyssey Math. What Works Clearinghouse Intervention Report (March 2009)<br><br>To identify instructional methods that might improve mathematics learning at this level when used in a variety of educational settings under typical conditions, the research team looked for promising, replicable practices that were being used broadly by teachers in U.S. schools, for which research showed promising results but had not been conducted using methodologies that can establish causal relationships. The Odyssey Math software product met all these criteria.<br><br>**Summary of Results:**<br>WWC identified 23 studies of Odyssey Math that were published or released between 1983 and 2008. Five studies are out of the scope of the review because they have an ineligible study design that does not meet WWC evidence standards; an additional 15 studies are out of the scope of the review, as defined by the middle school math protocol, for reasons other than study design. The remaining three studies are within the scope of the review and have an eligible design, but do not meet WWC evidence standards. The lack of studies meeting WWC evidence standards means that, at this time, WWC is unable to draw any conclusions based on research about the effectiveness or ineffectiveness of Odyssey Math. (Contains 3 footnotes.)<br><br>**Evidence of Effectiveness:** None or Unknown | |
| | **Study Description:** A Multisite Cluster Randomized Trial of the Effects of CompassLearning Odyssey Math on the Math Achievement of Selected Grade 4 Students in the Mid-Atlantic Region, Final Report, (NCEE 2009-4068)<br><br>In an effort to identify instructional methods that might improve mathematics learning at the grade 4 level when used in a variety of educational settings under typical conditions, the REL Mid-Atlantic research team looked for promising, replicable practices that were being used broadly by teachers in U.S. schools, for which research showed promising results but had not been conducted using methodologies that can establish causal relationships. CompassLearning's Odyssey Math met all these criteria.<br><br>The software consists of a web-accessed series of learning activities, assessments, and math tools. These components constitute the basic framework of the software. CompassLearning professional development trainers presented the learning activities, math tools, and assessments as available options to intervention teachers during the summer professional development session. This study was the first randomized controlled trial to assess the impact of Odyssey Math on student achievement. The study had the statistical power needed to detect a 0.20 effect size and was well designed in that comparable groups were created at baseline and maintained through post-testing. Implementation during the school year was documented and shown to be consistent with typical implementation of the Odyssey Math software. | Wijekumar, K., Hitchcock, J., Turner, H., Lei, P. W., and Peck, K. (2009) |

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| | **Summary of Results:**<br>The results from the multilevel model with pretest covariates also indicate that Odyssey Math did not yield a statistically significant impact on end-of-year student achievement. This study generated a statistically unbiased estimate of the effect of Odyssey Math on student achievement when implemented in typical school settings with typical teacher and student use.<br><br>However, the findings apply only to participating schools, teachers, and students because the study used a volunteer sample. Twelve appendices include (1) Detailed Professional Development Agenda Sessions; (2) Statistical Power Analysis; (3) Probability of Assignment to Study Conditions; (4) Sample Size from Random Assignment to Data Analysis; (5) Teacher Survey, Fall 2007; (6) Observation Protocols; (7) Odyssey Math Sample Screens; (8) Fidelity Observation Comparisons; (9) Model Variance and Intraclass Correlations; (10) Complete Multilevel Model Results for Research Question 1; (11) Comparison of Assumed Population Parameters for Statistical Power (During Planning Phase) with Corresponding Sample Statistics (During Analysis Phase); and (12) Equations for Multilevel Model Analyses. (Contains 3 figures, 22 tables, 10 exhibits, and 23 footnotes.) [This report was prepared for the National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences under contract with Regional Educational Laboratory Mid-Atlantic administered by Pennsylvania State University.]<br><br>**Evidence of Effectiveness:** None or Unknown | |
| **Title:** PLATO Achieve Now<br><br>**Description:**<br>PLATO Achieve Now is a handheld mobile instructional program for elementary and middle school grades. It delivers educational content as a series of interactive games via the PlayStation Portable (PSP®) system. Students can access learning materials in various environments and situations (elementary or middle school classrooms, learning centers or labs, summer school or after-school programs, etc.). PLATO Achieve Now comes with interactive software, school and home learning activities, teacher materials, professional development, and student assessment. The software | **Study Description:** Effectiveness of Reading and Mathematics Software Products: Findings from Two Student Cohorts (NCEE 2009-4041)<br><br>WWC reviewed 13 studies that investigated the effects of PLATO Achieve Now. Only one study (Campuzano, Dynarski, Agodini, & Rall, 2009) was a randomized controlled trial that met WWC evidence standards. The remaining 12 studies did not satisfy the WWC evidence standards, because none of the studies utilized a comparison group. The Campuzano et. al (2009) study took place during the 2004–2005 and 2005–2006 school years with a study sample that included 1,037 sixth-grade students in 13 schools across three districts in multiple states across the country.<br><br>**Summary of Results:**<br>The Campuzano et. al (2009) study reported negative but not statistically significant effects. There were three major assessment instruments used (a) Stanford Achievement Test–Tenth Edition (SAT–10), (b) Iowa Test of Basic Skills (ITBS), and (c) New Mexico Standards Based Assessment (NMSBA). The authors of the study converted the scale scores from these tests to normal curve equivalent (NCE) units. The results indicated an effect size of -.03 and an improvement index of -1. These negative effects were not large enough to be considered substantively important by WWC criteria (an effect size of at least 0.25) nor were the results statistically significant. | What Works Clearinghouse (2010) |

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| **Product Description** | **Description of Study, Summary of Results, *Evidence of Effectiveness** | **Resource** |
| challenges students to practice, learn, and advance through games that target mathematics skills via 28 mathematics Adventures, as well as games that target language arts and reading. The program allows students to learn at their own pace through software-based assessments that enable customized individual instruction with content appropriate for their skill level. PLATO Learning publishes this product. | **Evidence of Effectiveness:** None or Unknown<br><br>WWC rates the effects of an intervention in a given outcome domain as positive, potentially positive, mixed, no discernible effects, potentially negative, or negative. In the math achievement domain, findings from the Campuzano et. al (2009) study showed indeterminate effects. WWC categorizes the extent of evidence in each domain as small or medium to large. WWC considers the extent of evidence for PLATO Achieve Now to be small for math achievement. | |
| **Title:** SuccessMaker<br><br>**Description:**<br><br>SuccessMaker provides a digitally driven K–8 learning experience that is focused on fundamental concepts taught in mathematics and the needs of each individual student. The instruction is differentiated with mathematics content that combines instruction in fundamental skills with development of higher-order thinking strategies. The system's Initial Placement component identifies the challenges students to practice, learn, and advance through games that target mathematics skills via 28 mathematics Adventures, as well as games that target language arts and reading. The program allows students to learn at their own pace through software-based assessments that enable customized individual instruction with content appropriate for their skill level. PLATO Learning publishes this product. | **Study Description:** Pearson SuccessMaker Math Efficacy Study: 2009–2010 Final Report<br><br>SuccessMaker for mathematics was evaluated in 63 elementary and middle grade classrooms from 10 schools in seven states: Arizona, Arkansas, California, Indiana, Kansas, New York, and Pennsylvania. Participants included 505 third-grade students, 408 fifth-graders, and 273 in 7th grade. From these totals, 642 students randomly assigned to use SuccessMaker made regular use of the program while 544 students in comparison classrooms received supplemental instruction from noncomputerized supplemental mathematics programs.<br><br>An assessment battery was administered to students at baseline and again at the end of the school year. The assessment battery consisted of the Group Mathematics Assessment and Diagnostic Evaluation (GMADE) and also a self-report mathematics attitude survey developed by the principal investigator. The GMADE included 3 subtests: Concepts and Communication, Operations and Computation, and Process and Applications. A random intercepts model was employed to estimate and test model adjusted group mean differences. All statistical significance tests are two-tailed, with a Type I error rate of 0.05.<br><br>**Summary of Results:**<br>SuccessMaker students in all 3 grades statistically significantly outperformed their comparison group counterparts on the GMADE Total score the Process and Applications subtest. The magnitude of the difference in GMADE total performance observed at all three grades was 1.00, 0.53, and 0.61 standard deviations for 3rd, 5th, and 7th grade respectively. SuccessMaker students in 3rd and 5th grade statistically significantly outperformed their comparison group counterparts on the Operations and Computation subtest. However, on the Concepts and Communications subtest, the 5th grade comparison group statistically significantly outperformed the SuccessMaker group on this subtest, while the SuccessMaker students in 3rd and 7th grade performed statistically similar to the comparison group. The attitude survey showed that 3rd and 7th grade SuccessMaker students both had statistically significantly higher math academic attitudes than the comparison group. | Gatti, G., and Petrochenkov, K. (2010) |

| Table 1. Studies of Mathematics Software Products | | |
|---|---|---|
| **Product Description** | **Description of Study, Summary of Results, *Evidence of Effectiveness** | **Resource** |
| | **Evidence of Effectiveness:** None or Unknown<br><br>Pearson reports on its Web site that the study meets the gold standard for WWC. However, WWC has not published a review or report of this study. The study was short-term (1 year) and was supported by the program's developer. | |
| **Title:** Yearly ProgressPro<br><br>**Description:** Yearly ProgressPro is an online, computer-administered/scored curriculum-based measurement (CBM) product that relies on the curricular-sampling approach<br><br>to CBM. CTB/McGraw-Hill publishes this product. | **Study Description:** Yearly ProgressPro Research Synopsis<br><br>Two major studies of Yearly ProgressPro have been conducted. The technical data described in this document rely on those databases. Additional analyses on those databases are underway.<br><br>**Summary of Results From Study 1:** Examining the Relationship Between Yearly ProgressPro Curriculum-Based Measurement and Student Results on the Utah Criterion-Referenced Tests<br><br>The purposes of this study were to (a) obtain normative data and (b) examine the relation between student performance on Yearly ProgressPro and performance on the state-mandated Utah Assessment (UA). The sample was 50% male, 59% subsidized lunch, 37% African American, and 5% with individualized education programs (IEPs). Data were collected over the 2005–2006 school year.<br><br>In mathematics, the number of participants at each grade, 1–6, was 5168, 5254, 4924, 4964, 4837, and 4805. Students completed the UA in 1 to 36 weekly assessments. Normative data as well as correlations between the Yearly ProgressPro and UA scores were reported by grade level for mathematics and for reading and language arts.<br><br>**Summary of Results From Study 2:** Report on the Technical Adequacy of Yearly ProgressPro (Technical Report)<br><br>The purposes of this study were to (a) obtain normative data, (b) examine reliability, and (c) examine the relationship between student performance on Yearly ProgressPro and performance on the state-mandated South Carolina assessment as well as on three prominent tests (Iowa Test of Basic Skills, Stanford Achievement Test, and TerraNova). The sample was 50% male, 52% subsidized lunch, 53% African American, and 8% with IEPs.<br><br>Data were collected over the 2004–2005 school year. In mathematics, the number of participants at each grade, 1–8, was: 92, 91, 85, 81, 95, 100, 85, and 79. Students completed 17–19 weekly assessments between October and April. Normative data on year-end performance and on slopes of improvement were derived. Alpha coefficients were reported.<br><br>Correlations between Yearly ProgressPro and the criterion-measure scores were reported by grade level for mathematics, for reading language arts, and for Maze Fluency.<br><br>The technical data from the databases of the two studies above for mathematics are reported as year-end benchmarks and growth rates for Yearly ProgressPro as indicated below: | CTB/McGraw-Hill (2008) |

**Table 1. Studies of Mathematics Software Products**

| Product Description | Description of Study, Summary of Results, *Evidence of Effectiveness | Resource |
|---|---|---|
| | <table><tr><th>Grade</th><th>Year-End Benchmark</th><th>Slope of Improvement</th></tr><tr><td>1</td><td>21</td><td>0.48</td></tr><tr><td>2</td><td>18</td><td>0.33</td></tr><tr><td>3</td><td>15</td><td>0.20</td></tr><tr><td>4</td><td>17</td><td>0.32</td></tr><tr><td>5</td><td>15</td><td>0.20</td></tr><tr><td>6</td><td>16</td><td>0.25</td></tr><tr><td>7</td><td>11</td><td>0.14</td></tr><tr><td>8</td><td>13</td><td>0.25</td></tr></table> **Evidence of Effectiveness:** None or Unknown | |

*Note.* *Evidence of Effectiveness: *Strong* evidence refers to the quality ("randomized controlled trials are well-designed and implemented") and quantity (two or more school settings, including a setting similar to that of the client's schools/classrooms) of evidence that backs the intervention. *Possible* evidence is described as randomized controlled trials whose quality/quantity are good but fall short of strong evidence; and/or comparison-group studies in which the intervention and comparison groups are very closely matched in academic achievement, demographics, and other characteristics. See References for additional information on resources.