



Evaluation of Strategies to Address Unfinished Learning in Math (ReSolve Math Study)

Supporting Statement for Paperwork Reduction Act Submission

PART A: Justification

May 2023

Contract 91990021D0001 (Task Order 91990021F0357)

Submitted to:

Institute of Education Sciences
U.S. Department of Education

Submitted by:

MDRC
200 Vesey Street, 23rd Floor
New York, NY 10281-2103
Tel: 212-532-0832
Fax: 212-684-0832



Table of Contents

| | |
|--|-----------|
| A.1. Circumstances making collection of data necessary | 3 |
| A.1.1. Need for a Study of Strategies to Address Unfinished Learning in Math | 3 |
| A.1.2. Theory of Action..... | 4 |
| A.2. Purpose and use of data..... | 5 |
| A.3. Use of technology to reduce burden | 9 |
| A.4. Efforts to identify and avoid duplication | 9 |
| A.5. Efforts to minimize burden on small business or other entities | 10 |
| A.6. Consequences of not collecting data | 10 |
| A.7. Special circumstances | 10 |
| A.8. Federal register announcement and consultation | 10 |
| A.9. Payments to respondents | 12 |
| A.10. Assurance of confidentiality | 13 |
| A.11. Questions of a sensitive nature..... | 14 |
| A.12. Estimates of respondent burden | 14 |
| A.13. Estimates of cost burden to respondents..... | 16 |
| A.14. Estimates of annualized government costs | 16 |
| A.15. Changes in hour burden | 16 |
| A.16. Plans for tabulation and publication of results | 16 |
| A.16.1. Analysis Plan..... | 16 |
| A.16.2. Publication Plan | 17 |
| A.17. Display of expiration date for OMB approval..... | 18 |
| A.18. Exceptions to certification statement | 18 |
| References..... | 19 |

Table of Exhibits

| | |
|---|----|
| Exhibit A1. Theory of Change for Elementary School Math Catch-Up Strategy | 5 |
| Exhibit A.2. Primary Research Questions That the Study Will Address..... | 6 |
| Exhibit A.3. Description of Data Collection Activities Covered OMB Package | 7 |
| Exhibit A.4. Description of Data Collection Activities Not Requiring OMB Clearance..... | 8 |
| Exhibit A.5. Technical Working Group Members..... | 12 |
| Exhibit A.6. Estimated Respondent Time Burden and Costs for the Current Clearance Request | 15 |

PART A. Justification

Introduction

The Institute of Education Sciences (IES) within the U.S. Department of Education (ED) requests clearance to conduct new data collection activities for the *Evaluation of Strategies to Address Unfinished Learning in Math*. The evaluation (also referred to as the “ReSolve Math Study”) will determine if intensive and consistent student use of digital math products during regular class time improves 4th and 5th grade students’ math achievement. The study will also assess which of two possible instructional approaches that the digital products use to address unfinished learning is more effective at helping students catch up in math. This package requests clearance for study data collection activities, including: (a) teacher surveys; (b) school leader surveys; (c) extant school records and staff directory information from the study districts; and (d) parent/guardian consent forms for school records release. ED also plans to collect follow-up extant school records to assess long-term math outcomes for students in this study, but the clearance request for that collection will come in a separate package at a later date.

A.1. Circumstances making collection of data necessary

A.1.1. Need for a Study of Strategies to Address Unfinished Learning in Math

Recent national data show that 4th grade student math proficiency in the United States is at an all-time low with 64 percent of 4th grade student scoring below proficient on the National Assessment of Educational Progress (National Center for Education Statistics, 2022). Furthermore, disruptions caused by the coronavirus pandemic have exacerbated long-standing disparities in achievement between racial groups, students from low- and high-income families, and low- and high-performing schools. Title I of the Elementary and Secondary Education Act (ESEA), as amended in 2015 by the Every Student Succeeds Act (ESSA), is designed to address these problems by providing substantial funding intended to help schools close achievement gaps and provide an excellent education for all students. One of the key tools of Title I is the requirement to use evidence-based strategies when intervening to improve achievement in low-performing schools (S. 1177 - Every Student Succeeds Act, 2015).¹

One increasingly popular strategy with some evidence of promise involves students’ use of digital math products during class time (Cheung & Slavin, 2013; Escueta et al., 2020). Yet, there is still much to learn about these products’ effectiveness and open questions about how they can be most helpful for students. Moreover, in the aftermath of the pandemic, teachers are stretched thin and increasingly need to differentiate instruction for students with varying levels of unfinished learning (National Center for Education Statistics, 2022). The ReSolve Math Study will generate critical evidence about whether consistent and intensive use of digital products that deliver math instruction during regular class time can help teachers better differentiate instruction and subsequently improve their students’ achievement.

¹ See Sec. 1111(d) of Public Law 114-95.

The study will also provide much needed evidence on an important question in mathematics education in the wake of the pandemic: whether students’ math proficiency—in both the short- and long-term—is better served by an instructional approach that supports building mastery in all unfinished learning (“Broad Foundation Skill Building”) or by an instructional approach that targets unfinished learning ‘just-in-time’ by re-teaching only those prerequisite concepts thought to be necessary to succeed in grade-level content (“Focused Just-in-Time Skill Building”). By assessing which of these two different instructional approaches that experts continue to debate is most effective and for what kind of students, the study will provide much needed evidence to inform strategies to improve school performance and close equity gaps.

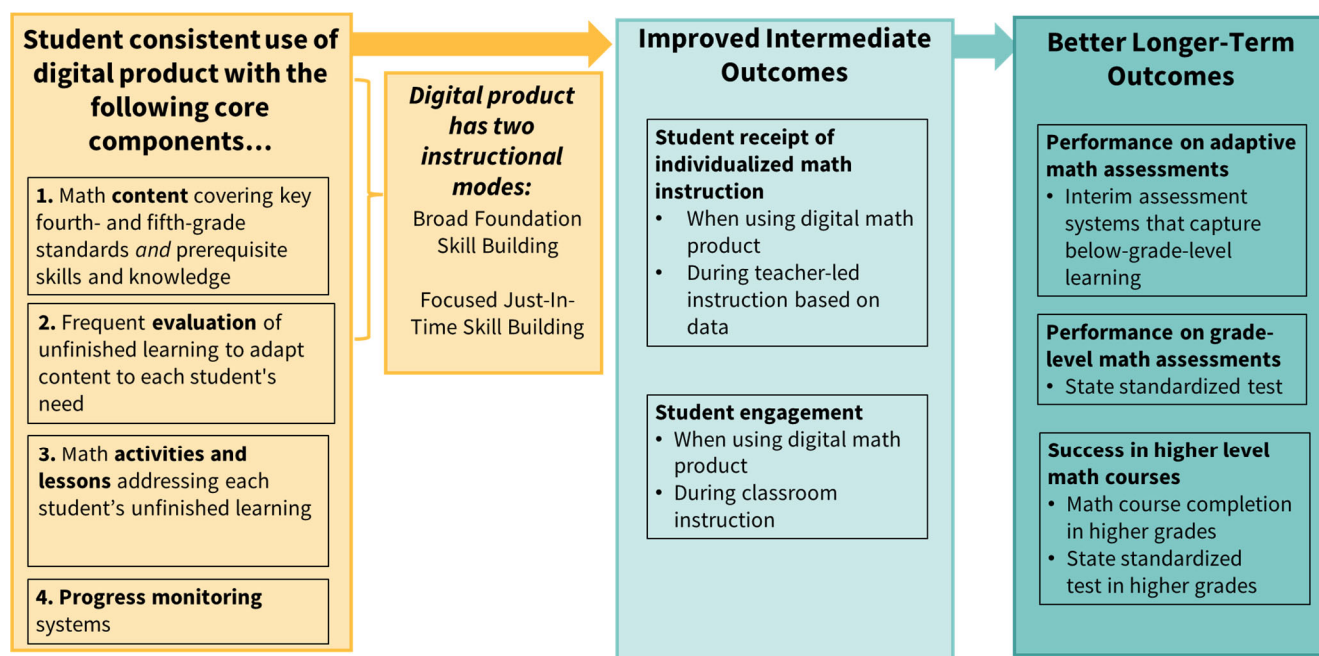
A.1.2. Theory of Action

This study will test a catch-up strategy to address unfinished learning in elementary math. The catch-up strategy involves consistent and intensive student use of digital math products during regular class time. Exhibit A.1 displays the general theory of change for the strategy. Each digital math product has four features or “core components” that are hypothesized to be key to supporting students with unfinished learning in math. There are two distinct ways that these features can be enacted, as described previously: Broad Foundation Skill Building and Focused Just-in-Time Skill Building.² Each digital product has two separate “modes” depending on which instructional approach is to be used. This aspect of the digital products allows the study to rigorously test the relative effectiveness of the two instructional approaches. The exhibit also shows intermediate outcomes hypothesized to emerge from the use of these digital products. These intermediate outcomes are then hypothesized to lead to improvements in the listed longer-term outcomes.

² **Broad Foundation Skill Building:** This approach is predicated on the hypothesis that the mastery of the mathematics learning progression that precedes a given grade level’s content is necessary for both students’ grade-level learning and their subsequent mathematics achievement. As such, it emphasizes mastery of unfinished learning from earlier grades.

Focused Just-In-Time Skill Building: This approach hypothesizes that students’ mastery of on-grade-level content and their subsequent mathematics achievement can be supported by providing students access to the specific content needed to bridge a gap in unfinished learning at the specific time it is needed. As such, it emphasizes on-grade-level content, supplementing it with content appearing earlier in the mathematics learning progression in a “*just-in-time*” manner.

Exhibit A.1. Theory of Change for Elementary School Math Catch-Up Strategy



The specific digital math products to be studied are Curriculum Associates LLC's i-Ready® Assessment and Personalized Instruction (i-Ready) and Renaissance Learning's Star Math and Freckle. Each product's personalized learning platform adheres to the four core components in Exhibit A.1, and each product is able to operate in two distinct modes aligned with each of the instructional approaches described above (Broad Foundation Skill Building; Focused Just-In-Time). Students in 4th and 5th grade math classrooms in participating schools will use one of the products in one of the two modes for 60 minutes per week during regular class time over the course of two years. There will be two cohorts of participating schools: Cohort 1 participates in school years 2023-2024 and 2024-2025, and Cohort 2 participates in school years 2024-2025 and 2025-2026.

A.2. Purpose and use of data

The study will use an experimental design to assess the effectiveness of using the digital math products and also to assess the relative effectiveness of the two instructional approaches that these products can use (Broad Foundation Skill Building and Focused Just-In-Time). The study will include approximately 150 elementary schools across 15 U.S. school districts. Study districts will indicate their preference for one of two digital math products that are part of the study. The study team will try to give each district its preferred product, subject to achieving approximate balance in terms of number of study districts using each product. Then, the study team will randomly assign schools to use the selected digital math product with their 4th and 5th grade students (program schools) or to continue with their "business as usual" math instruction (BAU schools). Finally, in program schools, individual students will be randomly assigned to receive one of the two instructional approaches (Broad Foundation Skill Building or Focused Just-in-Time Skill Building) from the product. (See Supporting Statement Part B for more information about the selection of the study sample.)

ED’s IES has contracted with MDRC and its partners, Digital Promise, RAND, Public Strategies, and Westat collectively referred to hereafter as the study team—to carry out the study and address six primary research questions shown in Exhibit A.2.

Exhibit A.2. Primary Research Questions That the Study Will Address

| RQ# | Research Question |
|-----|---|
| 1 | Did regular use of the digital math products improve student achievement? |
| 2 | Which instructional approach for the digital math products was more effective at improving student achievement? |
| 3 | Which teachers and students benefit most from student use of the digital math products? Which instructional approaches worked best for underserved students, particularly students who were the furthest behind and from low-income families? |
| 4 | Did students use the digital math products as intended? |
| 5 | Did use of the digital math products lead to greater individualization of the math instruction received by students? Did it improve student engagement? |
| 6 | What was the cost per student of using the digital products? What was their cost-effectiveness? |

The study team will answer the research questions by collecting information about (1) the baseline characteristics of students and teachers in the sample; (2) the instructional strategies used by teachers in the program schools and the BAU schools; (3) the intermediate and longer-term outcomes of students; and (4) the implementation and cost of the digital math products. Data will be collected starting in Fall 2023 through Spring 2026. Exhibit A.3 describes the purpose of the data collection activities for which approval is being requested in the current package. Additional data collection activities not requiring OMB clearance are also shown in Exhibit A.4 for context. Even longer-term follow-up data collection on student outcomes is also planned beyond Spring 2026 (i.e., state standardized tests and math course completion in higher grades), but approval for those activities will be requested in a separate package to be submitted at a later date.

Exhibit A.3. Description of Data Collection Activities For Which OMB Approval is Requested

| Data Source | Sample | Respondent | Mode and Timing | Purpose/use of data |
|--|--|--|--|---|
| Fall math teacher survey | Math teachers of 4 th & 5 th grade students in all participating schools | Teacher | Web-based survey collected in the Fall of 2023 (for all teachers in Cohort 1), in the Fall of 2024 (only for new teachers in Cohort 1; for all teachers in Cohort 2), and in Fall 2025 (only for new teachers in Cohort 2). | Used to collect teacher background and experience (e.g., teaching math and using technology) for study context and to explore differences in impacts based on teacher characteristics. (RQ3) |
| Spring math teacher survey | Math teachers of 4 th & 5 th grade students in all participating schools | Teacher | Web-based survey collected in the Spring of 2024 (Cohort 1), 2025 (Cohort 1 and Cohort 2), and 2026 (Cohort 2) | Used to describe implementation and assess the effects of the products on teacher individualization of math instruction and teachers' perceptions of student engagement with math. (RQ4, RQ5) |
| School leader survey | School leader most familiar with math instruction in each of the participating schools | School leader | Web-based survey collection in the Spring of 2024 (Cohort 1), 2025 (Cohort 1 and Cohort 2), and 2026 (Cohort 2) | Used to describe implementation from a school administrator perspective. (RQ4) |
| District directory data about school staff | 4 th and 5 th grade math teachers and school leaders working in participating schools | One staff member at each district | Electronic records for rosters of staff and teachers working in participating schools during the 2023-2024 (Cohort 1), 2024-2025 (Cohort 1 and Cohort 2), and 2025-2026 (Cohort 2) school years | Used to identify teacher and school leader survey sample and obtain their contact information for fielding the surveys. (RQ3, RQ4, RQ5) |
| District administrative records on students | 4 th & 5 th grade students in participating schools | One staff member at each district | Electronic records for students including demographic characteristics and academic achievement (state standardized test scores and adaptive assessments) for school years 2022-2023 (Cohort 1), 2023-2024 (Cohort 1 and Cohort 2), 2024-2025 (Cohort 1 and Cohort 2), and 2025-2026 (Cohort 2) | Used to describe sample characteristics and to assess impact on student achievement. (RQ1, RQ2, RQ3) |
| Parent or guardian consent forms for student records release | 4 th & 5 th grade students in participating schools (if consent for district records is required by school district) | Parents or guardians of 4 th & 5 th grade students | Electronic or paper forms collected from the parents or guardians in Fall of 2023 (Cohort 1), Fall 2024 (Cohort 1 and Cohort 2), and Fall 2025 (Cohort 2) | When required by districts, used to secure informed consent from parents or guardian for access to individual-level district records on students (RQ1, RQ2, RQ3) |

Exhibit A.4. Description of Additional Data Collection Activities Not Requiring OMB Clearance

| Data Source | Sample | Respondent | Mode and Timing | Purpose/use of data |
|---|--|---|--|--|
| Product data | 4 th & 5 th grade students in schools assigned to the program group and their teachers | One staff member at each product vendor to provide records | Electronic records on student and teacher interaction with the product collected from each product vendor in Summer 2024 (Cohort 1), 2025 (Cohort 1 and Cohort 2), and 2026 (Cohort 2) | Used to describe whether products were implemented as intended and to assess differences in students' receipt of individualized instruction and engagement between the two instructional approaches. (RQ4, RQ5) |
| Product vendor interviews | Vendor staff working to support product implementation and knowledgeable about costs. | Up to three staff members at each product vendor | Video or phone interviews in Spring of 2024 (Cohort 1), 2025 (Cohort 1 and Cohort 2), and 2026 (Cohort 2) | Used to assess costs of the products and to explain product implementation including facilitators and barriers. (RQ4, RQ6) |
| Interviews with technical assistance provider | Staff working at Digital Promise to support implementation in participating districts/schools. | Up to nine staff members at Digital Promise familiar with implementation across districts | Video or phone interviews in Spring of 2024 (Cohort 1), 2025 (Cohort 1 and Cohort 2), and 2026 (Cohort 2) | Used to describe implementation facilitators and barriers and to assess costs of implementation. (RQ4, RQ6) |
| Vendor progress reports & budget documents | Staff working at the vendors who manage the product implementation work and prepare budgets. | Up to three staff members of each vendor completing progress reports and budget materials | Electronic monthly submission to the study team | Used to assess costs of the products and to explain product implementation, including facilitators and barriers. (RQ4, RQ6) |

A.3. Use of technology to reduce burden

The data collection is designed to obtain information in an efficient way that minimizes respondent burden by using existing databases where possible. In addition to using available secondary data sources when feasible, the study team will take the following steps to reduce burden for the data collection activities covered by the current OMB clearance request:

- **Teacher (Fall and Spring) and School Leader Survey:** All surveys will be web-based. Web-based surveys reduce burden through: (1) skip patterns, which reduce the number of non-applicable questions a respondent sees, and (2) built-in edit checks (e.g., ensuring percentages do not total to more than 100 percent), which reduce response errors and decrease the need for the study team to reach out to respondents to check the accuracy of responses. Furthermore, using a web-based survey decreases the cost for postage, coding, keying, and cleaning of the data. Finally, this survey mode also allows respondents to complete the survey at a location and time of their choice.
- **District administrative records on students and directory data:** The study team will obtain all district/school records on students and staff in an electronic format via a secure file transfer system. As shown in Appendix E and F, requests for student records and directory data will detail the data elements needed, and prior to sharing the data request, the study team will schedule a short conversation with a point person in the district research office to discuss the data request and clarify any questions, with the aim of avoiding any confusion that could lead to duplicative or unnecessary effort by the district during the fulfillment of the data request. To further reduce the burden on district staff, the study team will accept data in any electronic format as opposed to requiring use of a consistent format from all districts. Study team members will convert all files into a consistent format to combine them for analysis.
- **Parent or guardian consent forms for student records release:** The study team will offer the consent form in multiple formats (including electronically where possible) and languages to enable families to complete the form in a manner easiest for them. Appendix G contains the current, English-language version of the consent form.

A.4. Efforts to identify and avoid duplication

When possible, the study will use secondary data sources to address the study RQs in Exhibit A.2 and reduce the amount of information being requested from study participants. For example, the study team will use student records data to measure student outcomes (e.g., state standardized test scores and adaptive assessment data) instead of fielding a math assessment solely for evaluation purposes. More generally, the data collection activities shown in Exhibits A.3 and A.4 capture information not available from existing sources.

A.5. Efforts to minimize burden on small business or other entities

No small businesses will be involved as respondents. Every effort will be made to minimize the burden on all respondents, whether they are from larger or smaller districts and schools.

A.6. Consequences of not collecting data

The study will generate critical information about whether and how digital math products can help teachers better differentiate instruction and to help students with unfinished learning catch up to grade level. The study will also contribute important evidence on what instructional approach to catching students up to grade level is most effective. If the study team does not collect these data, ED will be unable to provide policymakers, practitioners, and other stakeholders with this valuable evidence that has become even more critical in the aftermath of the coronavirus pandemic, where teachers increasingly find themselves overwhelmed with the instructional demands of the classroom and students have fallen behind more than ever in such a short period of time. Because using education technologies is already a popular strategy in low-performing schools to supplement math instruction, this study is necessary to help inform the maximization of benefits of this type of tool. Additionally, the study will provide insight into key debates in math education regarding the efficacy of two instructional approaches to math catch-up --“Broad Foundation Skill Building” and “Focused Just-in-Time Skill Building.” Addressing questions about which approach works best for different types of students can guide practitioners in their investments in digital math products and can inform instructional decision-making more broadly.

A.7. Special circumstances

There are no special circumstances involved with this data collection. The data collection will be conducted in a manner consistent with the guidelines in 5 CFR 1320.5.

A.8. Federal register announcement and consultation

A 60-day notice for the proposed information collection was published in the *Federal Register* (Vol. 88, No 30, page 9512) on February 14, 2023. Five non-substantive comments and one substantive comment were received. The comments did not lead to any changes in the study’s supporting statements or data collection plans. A 30-day *Federal Register* notice will be published to request additional public comments. Responses to the suggestions from the substantive comment are below:

- **Incorporate students’ perspectives:** The study team values students’ perspectives but is also cognizant of placing data collection burden on students. To minimize burden on students, the study team will gather product data on students’ experiences within the digital math products (see Exhibit A-4). Additionally, the teacher surveys

asks for teacher perceptions of their students' levels of engagement with the products.

- **Concern about internet and device access as a barrier to implementation:** The study team expects the digital math products to be used in schools with enough devices available for students to use the products in the classroom and does not require students to use the products at home. However, the study team also understands that not all schools have internet access. During recruitment, the study team will screen schools for their capacity to implement the program, which includes having reliable access to the internet and devices in schools. In this way, the study team does not expect internet and device access to be a major barrier to implementation in participating schools.
- **Alignment with schools' curricula:** One of the selection criteria for products to be used in the study includes that the products have content aligned with a wide range of 4th and 5th grade math standards and pre-requisite knowledge and skills. In this way, the products' lessons are expected to be well-aligned with the current classroom instruction or pre-requisites to that topic, but as part of recruitment, the study team will confirm that the products align with participating schools' curricula.
- **Teacher burden associated with implementation of the products:** The study team recognizes that implementing any new product can place a burden on teachers. However, the digital math products as deployed in this study are designed to have low start-up training burden on teachers and to ultimately reduce burden on teachers by helping students with unfinished learning catch up to grade level. The comment also notes the importance of stakeholder perspectives. The study will collect feedback on school staff perceptions of these products through annual teacher and school leader surveys.

To inform the study design, an external Technical Working Group (TWG) was convened with expertise in elementary math education, educational technology, and evaluation methodology. To date, the TWG members have advised on the study design and data collection plan, and they will continue to advise as needed on analysis plans and preliminary findings. Similar experts in math education and technology were consulted in the selection of the digital math products for the study. All of these individuals and their affiliations are listed in Exhibit A.5.

Exhibit A.5. Technical Working Group Members and Other Consultants

| Name | Organization |
|------------------|------------------------------------|
| June Ahn | University of California at Irvine |
| Ben Clarke | University of Oregon |
| Doug Clements | University of Denver |
| Sarah Davis | Independent Consultant |
| Lynn Fuchs | Vanderbilt University |
| Nancy Jordan | University of Delaware |
| Jennifer Knudsen | TERC |
| Ken Koedinger | Carnegie Mellon |
| William McCallum | Illustrative Math |
| Luke Miratrix | Harvard University |
| Julie Sarama | University of Denver |
| Kirk Walters | WestEd |
| Marcelo Worsley | Northwestern University |

A.9. Payments to respondents

High response rates are needed to reach valid conclusions about the impact and implementation of the digital math products. If district rules allow, the study will provide incentives to survey respondents to acknowledge the time it takes them to review survey materials and answers the questions. Incentives will be valued at the following for each survey:

Fall teacher survey: \$15

Spring teacher survey: \$25

School leader survey: \$20

The incentive amounts vary for the three surveys because of the different amounts of time each survey takes. Incentives in educational settings, in particular, have been shown to be effective; for example, in the Reading First Impact Study commissioned by IES, monetary incentives had significant effects on response rates among teachers. A substudy requested by the Office of Management and Budget (OMB) on the effect of incentives on survey response rates for teachers showed significantly higher response rates when an incentive of \$15 or \$30 was offered to teachers, as opposed to no incentive (Gamse et al., 2008).

In districts that require the study to seek active parent or guardian consent for administrative records collection, the study will also provide an incentive to classroom teachers for return of consent forms (irrespective of whether the parent or guardian agree or decline to allow the district to share data about their student). Classrooms that achieve a consent form return rate of 85% or higher will receive a gift valued at \$10 per student in the class for use on behalf of all students in the class. The study team will work with each district to determine the most appealing form of incentive for classrooms, such as a gift card, and how best to distribute it during the study period. The incentive amount is in recognition of the time it will take families and teachers

to learn about the study, complete the consent form and return it to the study team, and is consistent with IES's position on offering incentives in research studies.³

A.10. Assurance of confidentiality

The study team will conduct all data collection activities in full compliance with ED regulations and requirements to maintain the confidentiality of data obtained on private persons and to protect the rights and welfare of human research subjects, per the Education Science Reform Act of 2002 (Title 1, Part E, Section 183). Data collection activities will also be conducted in compliance with other Federal regulations, including the Privacy Act of 1974, P.L. 93-579, 5 USC 552 a; the Family Educational Rights and Privacy Act of 1974, 20 USC 1232g, 34 CFR Part 99; and related regulations, including but not limited to: 41 CFR Part 1-1 and 45 CFR Part 5b.

The study team will protect the full privacy and confidentiality of all data collected for the study and will use it for research purposes only. When reporting the results, the study team will present data only in aggregate form, so that individuals and school sites are not identified. The study team will also take the following steps to protect confidentiality:

- All data collection staff at MDRC and any data collection subcontractors will complete required background clearances (i.e., e-QIP) and will sign agreements that emphasize the importance of confidentiality and specify employees' obligations to maintain it.
- All members of the study team with access to the data will be trained and certified on the importance of confidentiality and data security. Staff will receive training regarding the meaning of confidentiality, particularly as it relates to handling requests for information and providing assurance to respondents about the protection of their responses. Measures to maintain confidentiality will include built-in safeguards concerning status monitoring and receipt control systems.
- PII will be maintained on separate forms and files that will be linked to other study data using study-specific identification numbers. All data containing such information will be stored in a cloud-based server system that meets ED's security requirements.
- Access to a crosswalk file linking study-specific identification numbers to PII and contact information will be limited to a small number of individuals who have a need

³ The May 2022 memorandum, "Guidelines for Incentives for REL Research Studies," prepared for OMB, notes that incentives should be considered to acknowledge how extremely valuable respondents' time is. Teachers and students will need to go out of their way to share the consent form with parents and guardians and to collect returns. Families will also need to go out of their way to review and complete the consent form, but compensating families directly is not logistically feasible for the study and so their collective efforts will be acknowledged via a classroom incentive that benefits their students. An experiment conducted as part of the NLTS 2012 (OMB control #1850-0882) found a \$10 incentive to be an effective strategy for obtaining consents from parents and youth.

to know this information. All staff with access to these data will go through required background clearances (i.e., e-QIP) and will receive training about confidentiality.

- Access to printed documents will be strictly limited. Documents will be stored in locked files and cabinets. Discarded materials will be shredded.
- All data will be kept in secured locations, and identifiers will be destroyed as soon as they are no longer required. Access to electronic files will be protected by secure usernames and passwords that will be available only to approved users. All data collected in the field will be saved in fully encrypted laptops until the data can be moved to a cloud-based server system that meets ED's security requirements.
- To ensure that study participants are properly protected, MDRC's Institutional Review Board will review the study design protocols, informed consent process, data security plan, and all data collection instruments and procedures.
- All data containing individually identifiable records will be destroyed by an appropriate fail-safe method, including physical destruction of the media itself or deletion of the contents on our servers. After the study is completed, the study team will create a restricted access file of the data collected and submit that file to IES. This file will have been stripped of all individual, school, and district identifiers.

All voluntary requests for information will be accompanied by statements indicating that:

- Information collected for this study comes under the confidentiality and data protection requirements of the Institute of Education Sciences (The Education Sciences Reform Act of 2002, Title I, Part E, Section 183). Responses to this data collection will be used by the U.S. Department of Education, its contractors, and collaborating researchers only for statistical purposes. Reports will summarize findings across the sample and will not associate responses with specific school or individual. All the information you provide may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose except as required by law (20 U.S.C. §9573 and 6 U.S.C. §151).

A system of records notice is currently being prepared for this study. ED expects to publish the notice in summer 2023.

A.11. Questions of a sensitive nature

There are no sensitive questions in this data collection.

A.12. Estimates of respondent burden

Exhibit A.6 summarizes reporting burden on respondents for data collections included in the current request over the next three years. The estimated hour burden for these study data

collections is 7,676 hours over three years, or an average of 2,559 hours per year. The estimated total burden cost is \$235,608, or \$78,536 per year.

Exhibit A.6. Estimated Respondent Time Burden and Costs for the Current Clearance Request

| | Timing of Administration for Two Cohorts | Total Number of Respondents ^a | Estimated Number of Responses Per Administration ^b | Number of Administrations Per Respondent | Average Minutes per Response | Total Time Burden (Hours) | Estimated Average Hourly Wage ^c | Total Cost Burden |
|--|--|--|---|--|------------------------------|---------------------------|--|-------------------|
| Fall math teacher survey (Year 1) | Fall 2023 (Cohort 1); Fall 2024 (Cohort 2) | 1,200 | 1,020 | 1 | 10 | 170 | \$32 | \$5,440 |
| Fall math teacher survey (Year 2) | Fall 2024 (Cohort 1); Fall 2025 (Cohort 2) | 240 | 204 | 1 | 10 | 34 | \$32 | \$1,088 |
| Spring math teacher survey | Spring 2024 (Cohort 1); Spring 2025 (Cohort 1 and Cohort 2); Spring 2026 (Cohort 2) | 1,200 | 1,020 | 2 | 25 | 850 | \$32 | \$27,200 |
| School leader survey | Spring 2024 (Cohort 1); Spring 2025 (Cohort 1 and Cohort 2); Spring 2026 (Cohort 2) | 150 | 128 | 2 | 15 | 64 | \$49 | \$3,136 |
| District directory data about school staff | Fall 2023 (Cohort 1); Spring 2024 (Cohort 1); Fall 2024 (Cohort 1 and Cohort 2); Spring 2025 (Cohort 1 and Cohort 2); Fall 2025 (Cohort 2); Spring 2026 (Cohort 2) | 15 | 15 | 4 | 360 | 360 | \$46 | \$16,560 |
| District administrative records on students | Fall 2024 (Cohort 1); Fall 2025 (Cohort 1 and Cohort 2); Fall 2026 (Cohort 2) | 15 | 15 | 2 | 960 | 480 | \$46 | \$22,080 |
| Parent or guardian consent forms for student records release | Fall 2023 (Cohort 1); Fall 2024 (Cohort 1 and Cohort 2); Fall 2025 (Cohort 2) | 36,113 | 34,308 | 1 | 10 | 5,718 | \$28 | \$160,104 |
| Total Over Three Years | | 38,933 | | | | 7,676 | | \$235,608 |
| Average Over Three Years | | | | | | 2,559 | | \$78,536 |

^a The size of the respondent universe is estimated based on the assumption of 15 school districts, 150 schools, four math teachers per grade level per school year (with 20% of teachers new to the study in Year 2, a total of 240 teachers), and 75 students per grade level per school year (with 21% of 5th grade students new to the study in Year 2, a total of 2,363 new 5th graders). Assumptions about the number of students and teachers per school are based on the Common Core of Data for school year 2018-19 for the target population of schools for the study. Assumptions about teacher mobility rates are based on

national rates for mid- and high-poverty schools (National Center for Education Statistics, 2022) and student mobility rates are based on school year and summer mobility rates reported in Potter *et al.* (2019, 2020).

^b For the purposes of estimating burden, this table assumes that 100% of participating districts will respond to requests for records and directory data, 85% of school leaders and teachers will respond to surveys and that 95% of parents or guardians will return consent forms, regardless of whether respondents agree or decline to the release of their child's records. These assumptions about response rates on consent forms are based on other recent ED evaluations in elementary schools (e.g., Impact Evaluation of Training in Multi-Tiered Systems of Support for Reading in Early Elementary School).

^c Wage estimates are based on the Occupational Employment and Wage Statistics data maintained by the Bureau of Labor Statistics (<https://www.bls.gov/oes>).

A.13. Estimates of cost burden to respondents

The information collection activities covered by the current clearance request do not require respondents to incur capital and start-up costs, new maintenance costs, or any costs of purchased services.

A.14. Estimates of annualized government costs

The total cost for the study is estimated to be \$10,000,000 over five years, or an annual cost to the federal government of \$1,666,667.

A.15. Changes in hour burden

This clearance request covers new collections of information only.

A.16. Plans for tabulation and publication of results

A.16.1. Analysis Plan

The data collection activities described in this submission will allow the study team to assess the effectiveness, implementation, and costs of using digital math products to address unfinished math learning for upper elementary school students, as well as the relative effectiveness of two different instructional approaches that the digital products can take to help students reach grade-level standards. The study team will use the analytic approaches summarized below to conduct the evaluation and address the research questions listed in Exhibit A.2 (see Part B for additional details).

Analyses to Assess Effectiveness. The study team will estimate the effectiveness of the digital math products relative to business-as-usual (BAU) and the relative effectiveness of the two instructional approaches delivered by the products (Broad Foundation Skill Building vs. Focused Just-in-time). These analyses will assess effects on students' performance on grade-based assessments (e.g. state standardized test scores) collected through district administrative records for students, and on students' foundational math skills collected through district-

administered adaptive assessments, if available. The analyses will also assess effects on intermediate outcomes listed in the theory of action (Exhibit A.1). As indicated in Exhibit A.3, these intermediate outcomes are primarily measured through the teacher survey.

The study team will estimate the effect of the digital math products by using regression models to compare the outcomes of students in schools randomly assigned to the program group and students in schools randomly assigned to the BAU group. Additionally, the study team will estimate the relative effect of the two instructional approaches by using regression analyses to compare the outcomes of program school students randomly assigned to each of the two instructional modes. The regression models will adjust for student baseline covariates, drawing on information from district/school records for students, to improve precision and guard against imbalances across groups that arise due to chance or attrition from the study. The study team will also use the regression models to learn about the effectiveness of the products, and the relative effect of the instructional approaches or modes, for certain types of teachers and students who may stand to benefit the most from them (e.g., those students performing far below grade level in math at the start of the study, or those teachers who have the lowest self-efficacy in math).

Analyses to Assess Implementation. The study team will describe program schools' implementation of the digital math products by summarizing information from the product vendors on teacher participation in product training as well as product data about teacher and student usage of the products. The team will also summarize school leader, teacher, and product vendor reports of implementation barriers and facilitators as measured through teachers and school leader surveys, vendor progress reports, and interviews of the implementation support teams.

Finally, the study team will use measures from the school leader and teacher surveys to describe and compare the education technology products used, including their frequency of use, in the program and BAU schools.

Analyses to Assess Costs. The study team will use the ingredients approach to measure and analyze costs (Levin & McEwan, 2000). Drawing on vendor documents and interviews, the team will identify the ingredients necessary to implement the digital math products. The team will estimate the average *costs per student* of the products and use those costs and the estimated effect of the digital math products to generate cost-effectiveness (CE) ratios.

A.16.2. Publication Plan

The study team will conduct one round of analysis and reporting for ED using the data detailed in this clearance request and the methods described in the previous subsection. The final report will provide a succinct overview of the study context and design. The report will also present impact analysis findings for all student and teacher outcomes and findings from the analyses of costs and implementation. This report is expected to be released in 2026. The report will follow guidance provided in the *NCES Statistical Standards* (NCES, 2003) and the *IES Style Guide* (ED, IES, 2005). In addition, the report will be accompanied by a brief that succinctly summarizes key findings for the public, along with a set of detailed technical appendices.

A.17. Display of expiration date for OMB approval

No exemption is requested. All data collection instruments will include the OMB expiration date.

A.18. Exceptions to certification statement

No exceptions are needed for this data collection.

References

- Cheung, A. C., & Slavin, R. E. (2013). Effects of Educational Technology Applications on Reading Outcomes for Struggling Readers: A Best-Evidence Synthesis. *Reading Research Quarterly*, 48(3), 277-299.
- Escueta, M., Nickow, A. J., Oreopoulos, P., & Quan, V. (2020). Upgrading Education with Technology: Insights from Experimental Research. *Journal of Economic Literature*, 58(4), 897-996. <https://doi.org/10.1257/jel.20191507>
- Gamse, B. C., Bloom, H. S., Kemple, J. J., & Jacob, R. T. (2008). *Reading First Impact Study: Interim Report. NCEE 2008-4016*. <http://www.eric.ed.gov/ERICWebPortal/detail?accno=ED501218>
- Levin, H. M., & McEwan, P. J. (2000). *Cost-effectiveness analysis: Methods and applications* (Vol. 4). Sage.
- National Center for Education Statistics. (2022). Teacher Turnover: Stayers, Movers, and Leavers. *Condition of Education*. U.S. Department of Education, Institute of Education Sciences. Retrieved 12/14/22, from <https://nces.ed.gov/programs/coe/indicator/slc/>
- National Center for Education Statistics. (2022). 2022 NAEP Mathematics Assessment Highlights. *NAEP Report Card*. U.S. Department of Education, Institute of Education Sciences. Retrieved 12/14/22, from <https://www.nationsreportcard.gov/highlights/mathematics/2022/>
- Potter, D., Alvear, S., Bao, K., & Min, J. (2019). *Changing Schools, Part 2: Student Mobility During the School Year in Texas and the Houston Area*. Houston, TX. Houston Education Research Consortium, Kinder Institute for Urban Research, Rice University. Retrieved 12/19/22, from <https://rice.app.box.com/s/num2aubml7err9i0fs18sacrhg5dlhiy>
- Potter, D., Alvear, S., Bao, K., Kennedy, C., & Min, J. (2020). *Changing Schools, Part 1: Student Mobility During the Summer Months in Texas and the Houston Area*. Houston, TX. Houston Education Research Consortium, Kinder Institute for Urban Research, Rice University. Retrieved 12/19/22, from <https://rice.app.box.com/s/dmqrhdq0f4aaxx7fdix69nw17orghoxx>
- S. 1177 - Every Student Succeeds Act, (2015, December 10). <https://www.congress.gov/bill/114th-congress/senate-bill/1177>
- U.S. Department of Education. (2018). *Table 6. Average Class Size in Public Schools, by Class Type and State: 2017–18*. Available at https://nces.ed.gov/surveys/ntps/tables/ntps1718_ftable06_t1s.asp