

## Recommended Use

This guide highlights the capabilities of each digital learning platform for external researchers interested in conducting experimental studies. The below table highlights the similarities and differences between the DLPs at varying stages of the research process - more detailed information on each platform, as well as other possibilities for non-experimental studies or alternate collaborations can be obtained from the platforms themselves. As network lead, SEERNet welcomes questions and feedback from interested partners - stay tuned for more content and future opportunities!

	E-Trials (Assistments)	UpGrade (Mathia)	Terracotta (Canvas)	Kinetic (OpenStax)	Learning at Scale (ASU)
User Population	K-12 math students using OER math curriculum	6-12 math students using Mathia, teachers using MATHia	6-16 students using Canvas	Post-secondary students preferably using OpenStax textbooks	Post-secondary online ASU students
Research Questions	Effectiveness of student supports for math learning	Improvements to student learning based on alternative presentations of material. Also motivational and related improvements due to design, messaging, etc.	Impact of learning activities and assignment context within Canvas on student mindset and performance	Learner characteristics and their influence on behavior, performance, and psychosocial constructs	ASU L@S affords a wide range of questions regarding learning in credit-bearing courses that utilize long-term and short-term student performance data and various student demographics.



This project is supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305N210034 to Digital Promise. The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.

<b>Pre-Registration /Vetting</b>	Pre-register on OSF.io	Verify feasibility of intervention with Carnegie Learning design team and interested district, including completing pre-registration form	No formal vetting process	Pre-register on OSF.io recommended	ASU Provost's Office
<b>IRB requirements</b>	Normal educational practice covered by existing ASSISTments IRB, external researchers get an IRB to receive data.	Researchers use own IRB (if needed)	Researchers use own IRB	Researchers submit to Rice IRB	ASU IRB, researchers use own IRB
<b>Recruitment</b>	No recruitment necessary - all users eligible. The timing of the study will depend on when the teachers assign the problems as determined by the curriculum order/time of year.	Researchers recruit school(s)/district(s) using Mathia's customer base, and may need to initiate data-sharing agreements with these districts.	Teachers (at institutions where Terracotta has been integrated) recruit students to participate in study. In the event that the researcher is not a teacher, the researcher recruits teachers to participate.	Students opt-in, incentivized, institutional partnerships	Recruitment depends on existing data or implementing interventions/surveys.
<b>Randomization</b>	Student-level random assignment	Individual or group random assignment (class, teacher, school, district)	Student-level random assignment AND student/assignment-level randomization (within-subject crossovers)	Student-level random assignment	Affords randomization at individual or group level depending on research question.
<b>Intervention</b>	Set of student supports for one or more problems	Alternate unit of instruction/activity in Mathia. Messaging, hints, presentation and design features.	Assignments	Open-ended based on capabilities of Qualtrics	Affords randomization at individual or group level depending on research question.



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<p><b>Prior achievement/ demographic data</b></p>	<p>Class/group membership, school/class-level contextual data, prior ASSISTments achievement</p>	<p>Class/group membership, prior Mathia achievement</p>	<p>Existing data within Canvas course site (gradebook, activity, assignments), and any student-level data added by the Teacher</p>	<p>Learner characteristics collected by Kinetic across studies</p>	<p>Data warehouse will contain demographic, achievement, course activity data</p>
<p><b>Outcome Measures</b></p>	<p>performance on Similar-but-Not-the-Same (SNS) problems</p>	<p>Mathia process measures, performance, and survey measures</p>	<p>Canvas gradebook, activity, assignments, data added by teacher</p>	<p>Researcher-administered measures in Qualtrics In future versions, connections to institutional data (course grades, etc)</p>	<p>Course activity, grades, persistence/graduation</p>
<p><b>Analysis</b></p>	<p>Data export, posted to OSF.io</p>	<p>Data export</p>	<p>Data export, possible analysis tools</p>	<p>Secure data enclave allows researchers to run analysis with full dataset without access to PII</p>	<p>Data warehouse</p>