

Tier 3: Using Promising Evidence to Inform Educational Technology Use

Identifying Relationships between Practice and Relevant Outcomes to Guide School Implementation

Building evidence that meets Tier 3

The [Elementary and Secondary Education Act](#) of 1965 (ESEA) encourages state and local educational agencies to prioritize evidence-based interventions, strategies, and approaches. Under ESEA, there are four tiers of evidence: (1) [Strong Evidence](#), (2) [Moderate Evidence](#), (3) [Promising Evidence](#), and (4) [Demonstrating a Rationale](#). The Department has defined those terms for use in ESEA and other programs in its regulations (see [34 CFR 77.1](#)). At the *Promising Evidence*¹ tier, education practices are supported by at least one well-designed [correlational study](#) exploring the *relationship* between two or more **variables**. In education, such a study would examine the relationship between an **intervention** and a **relevant outcome**.

Tier 3 and educational technology use in schools

Information from Tier 4 activities (e.g., review of existing evidence) can be used to develop a Tier 3 study plan for using and evaluating educational technologies in schools. To build Tier 3 evidence, state and local educational agencies may need to partner with internal and external education evaluation organizations to:

- ❖ administer a **high-quality outcome measure** to accurately assess student performance on outcomes related to educational technology use
- ❖ use **administrative data** collected before, during, or after implementation of the educational technology intervention as part of the analysis of whether relationships exist between outcomes and the intervention
- ❖ enter data into **statistical software** to calculate correlations between the intervention and outcome measures – including **control** variables found in administrative data to account for **selection bias**
- ❖ conduct classroom **observations** to identify the quality of implementation, other factors, and provide context for understanding any statistical relationships between outcomes and technology use.



Key Evidence Terms

- **Correlational study:** An approach for examining the relationship between two or more variables
- **Variables:** Characteristics that can take on different values, be measured, or observed
- **Intervention:** A set of practices/tools meant to produce specific outcomes or results
- **Relevant outcome:** The desired objectives or results of an intervention
- **Observation:** An approach for collecting data in which the observer immerses themselves in the environment of interest to analyze the implementation of an intervention
- **High-quality outcome measure:** A measure previously evaluated for its accuracy in measuring what it claims to measure (validity)
- **Administrative data:** Information that has already been collected, often as part of organizational business or reporting requirements
- **Statistical software:** Tools used to analyze data for patterns and relationships
- **Control:** Variables that are accounted for to prevent them from affecting study results
- **Selection bias:** Differences between study populations unrelated to the intervention that could impact study results

¹ For full definitions in the Education Department General Administrative Regulations of key terms, please visit <https://www.ecfr.gov/current/title-34/part-77>



Case Study: Putting Tier 3 into Action

A school district is interested in using a new science app intervention, installed on students' laptop devices, to increase 3rd-6th graders' science identity development. The districts' technology team previously conducted a needs analysis and developed a logic model outlining the rationale, activities, and relevant outcomes of integrating the intervention into classroom practice as part of an initial pilot test (see Tier 4). The results of pilot testing encouraged the school district to think that the app might hold potential for being a promising intervention to improve student outcomes, suggesting the opportunity for more rigorous evidence-building.

Your turn! If this example was in place in your school or district, what student outcomes would you consider, when building evidence, to indicate a promising educational technology intervention?

With guidance from internal and external evaluation partners, the school district technology team used initial pilot results to develop a plan for examining the relationship between science app intervention use and student science identity development, after controlling for potential sources of bias. The school district leveraged its partnership with a local university to connect with its school research practice partnerships program. A graduate student team was matched with the district to support data collection and analysis for the project as outlined below:

Correlational Study Plan for a Science App Intervention

<i>Research Question: Is there a relationship between using the science app and student science identity?</i>				
Intervention	Frequency	Outcome Measures	Participants	Data Analysis
Voluntary Intervention use during home room classroom hours	Up to 2 times per week for 12 weeks for 30 minutes total	Student Science Identity Survey Classroom Observation Protocol	School A: 50 students (2 classrooms) School B: 50 students (2 classrooms)	Use regression analysis to identify relationship between app use and post-test scores, with controls for bias (e.g., student demographics, school characteristics)

The school district technology team settled on offering the app as a voluntary enrichment activity to students. Four classrooms across two schools agreed to participate. Students were offered the app as one way to build their science identities, but use was voluntary. Students who chose to use the app were expected to do so for 15 minutes per session, 2 times a week, for 12 weeks. Student science identity was measured for all students – including those who did not use the app – both prior to the app's introduction (pre-test) and at the end of 12 weeks (post-test). The research team used statistical software to determine whether there was a relationship between students' use of the app and science identity.

Your turn! Consider an educational technology tool your school or district has successfully used for which you would like to build more evidence. What would evidence-building look like? How might your school or district partner with organizations to build Tier 3 evidence?

Students' science identity survey scores increased after using the science app, even after controlling for demographics and intervention use - indicating promising evidence for continued use of the intervention. The district technology team found there was a positive correlation between app use and student science identity. Schools A and B voted to allow teachers to opt-in to using the intervention. School district administrators also expressed positive interest in these results and wanted more evidence at the Tier 2 or Tier 1 level before allocating the budget necessary to adopting the science app district wide.

