MATHEMATICA Policy Research

AUGUST 2017

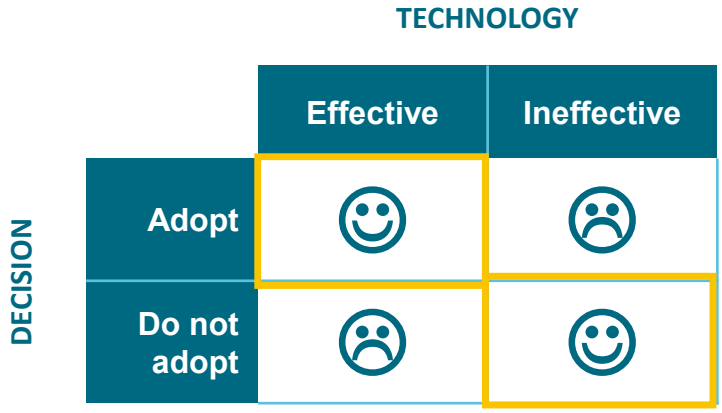
# THINGS to CONSIDER

How do I use data to inform my decisions and adopt effective technologies?

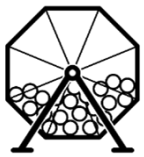
## How to Design a Successful Pilot

It's common practice to roll out a new technology to all students as quickly as possible. But what if you could learn how likely a new technology was to work at your school, in your district, or in your unique setting before you rolled it out at scale? Here are some things to think about to help you get the data needed to make evidence-based decisions.

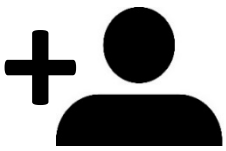
A well-designed pilot will enable you to use outcome data to determine which effective technologies to adopt and which ineffective technologies not to adopt.



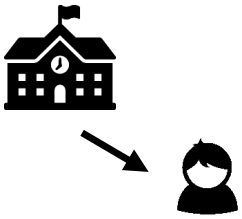

### To maximize the likelihood of making the right decision…



Use randomization when possible



Include more participants



Randomize at the lowest possible level

Take advantage of pre-intervention data

Think carefully about what will define success



**Conduct your own rapid cycle evaluation at http://www.edtechrce.org.**

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Why should I use randomization to determine who uses the technology?

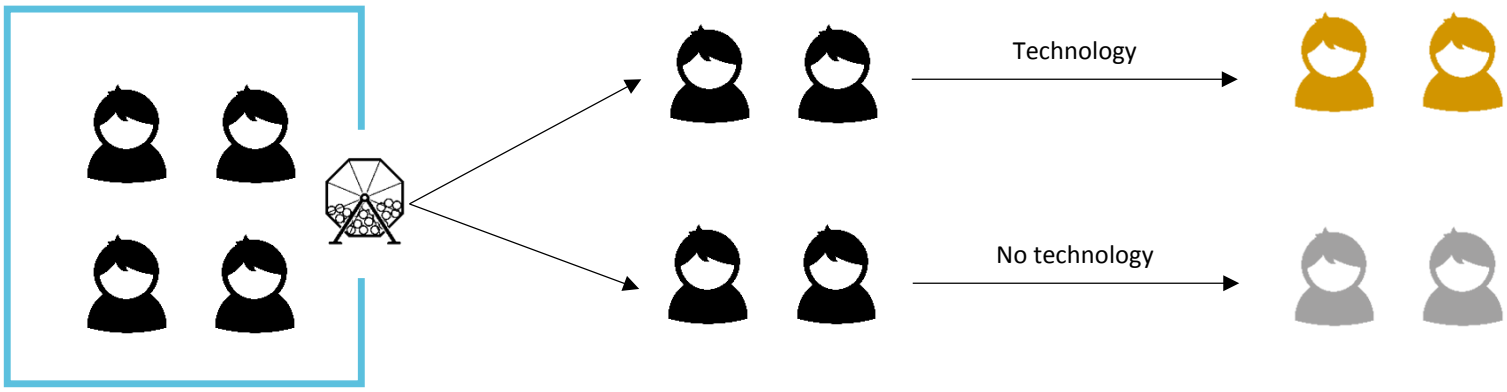
## Considerations when planning a pilot:

# Randomization

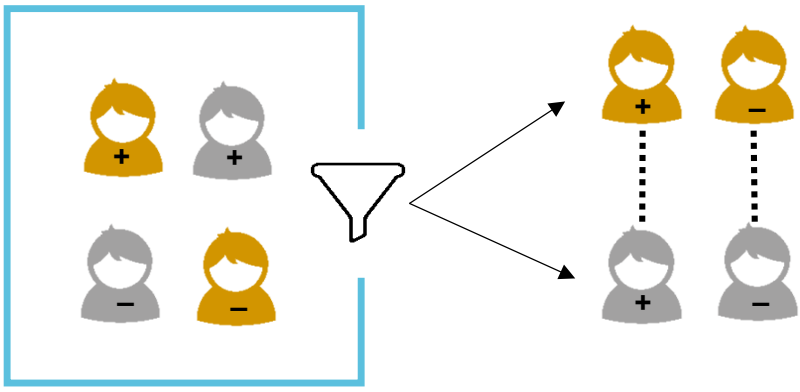
**Technology's impact =**

**User outcomes** — **Nonuser outcomes**

To be confident that the difference in outcomes between users and nonusers is caused only by the technology—not by any other factors—you must make sure that your users and nonusers are similar in every way except for their use of the technology.




By randomly assigning who gets access to the technology, users and nonusers will be similar on both observed characteristics (such as English-learner status) and unobserved characteristics (such as motivation).



If you can't randomly assign who gets access to the technology, you might be able to use a method called matched comparison. With this method, you use background data to find nonusers who are similar to your users. Your groups will then be similar on observed characteristics, but they may differ on unobserved characteristics.



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# THINGS to CONSIDER

How many students, classrooms, or schools do I need?

## Considerations when planning a pilot:

# Number of participants

**Technology's impact =**

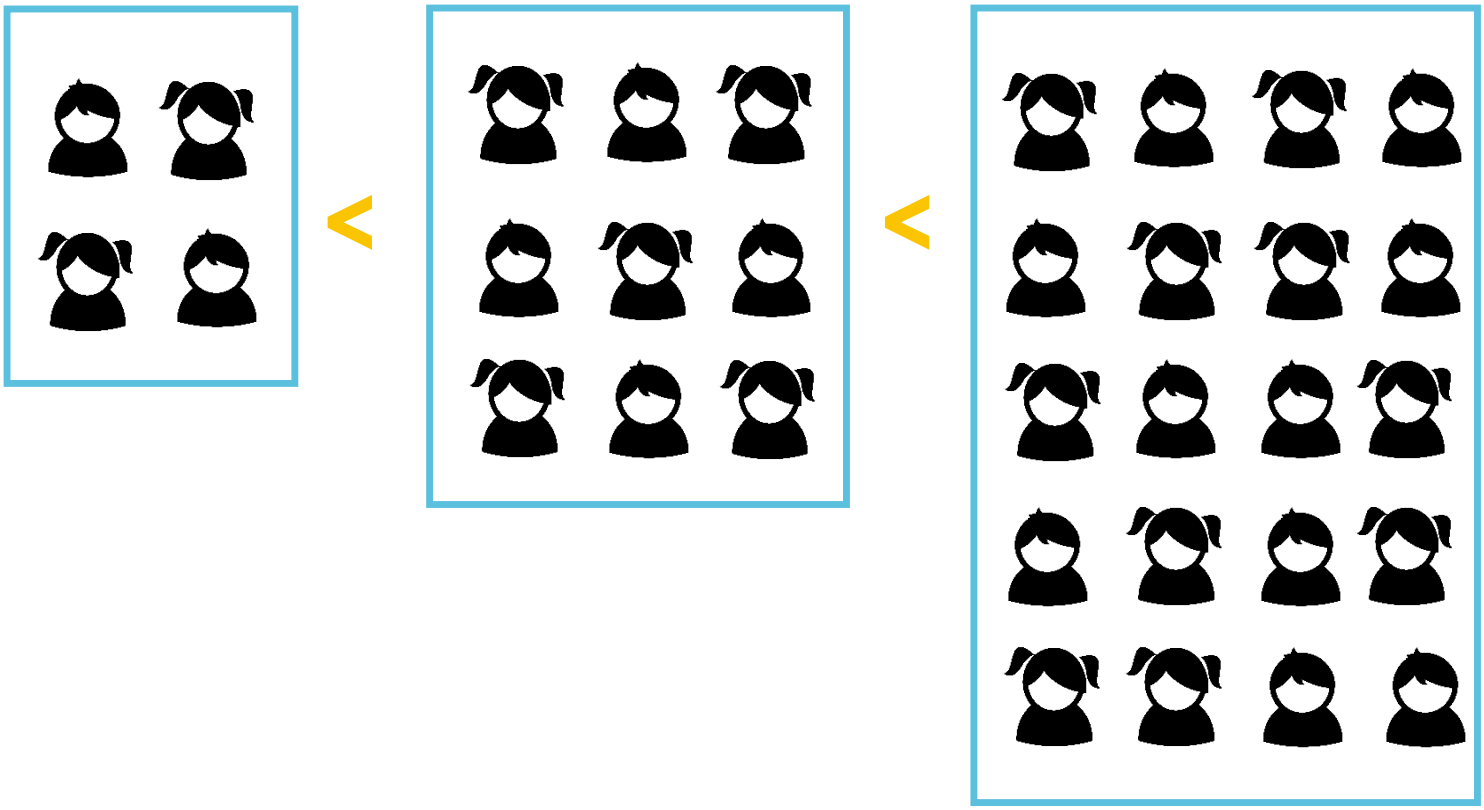
**User outcomes**

—

**Nonuser outcomes**

At the simplest level, the technology's impact is the difference in outcomes between two people—a user and nonuser. But if you only have two people in your comparison, they may have different characteristics—such as age or gender—that also contribute to differences in their outcomes. Including more people in your comparison reduces the chance that extraneous factors are driving any differences you observe.

**The more individuals you compare, the more confident you can be that the difference you see is caused only by the technology.**





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# THINGS to CONSIDER


## Considerations when planning a pilot:

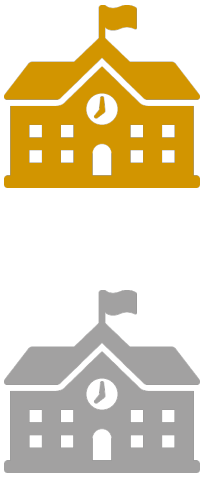
# Unit of assignment

### How do you assign technology use?

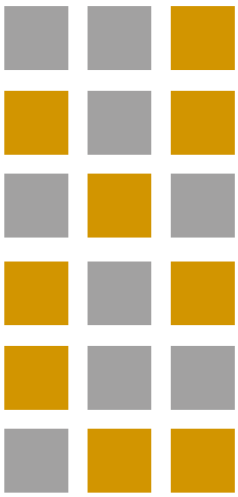
There are a number of ways to choose who gets access to the technology. You can select specific students, teachers, classrooms, or schools. But comparing two classrooms is similar to comparing two students. Unique factors within each classroom, such as teacher quality, could also affect the outcomes.

**You have 2 schools, each school has 9 classrooms, and each classroom has 10 students.**

You can assign the technology to one school and not the other.



You can assign the technology to 9 of the 18 classrooms.



You can assign the technology to 90 of the 180 students.

Confidence in your findings increases with a lower unit of assignment

Ease of implementation increases with a higher unit of assignment

**The same number of students are involved in each evaluation scenario, but your decision about the unit of assignment involves a trade-off between ease of implementation and confidence in your findings.**

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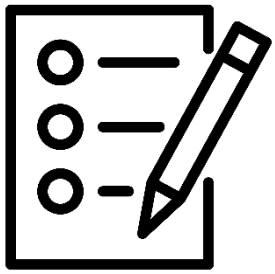
# THINGS to CONSIDER

How much information do I have about the study participants?

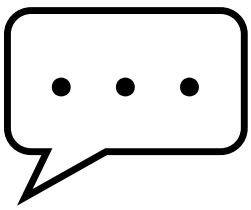
## Considerations when planning a pilot:

# Data availability

**Many factors could affect your outcome of interest.**



If you are interested in student achievement, as measured by test scores, think about other factors that could affect student performance on a test.



**English-learner status**

**Free or reduced-price lunch status**

**Past performance**

Including previous test scores or background characteristics in your evaluation can help you see whether the differences in outcomes were caused by the technology or by pre-existing differences in the students' characteristics.

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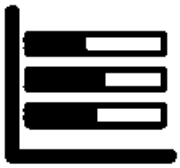
## Considerations when planning a pilot:

# Meaningful impact

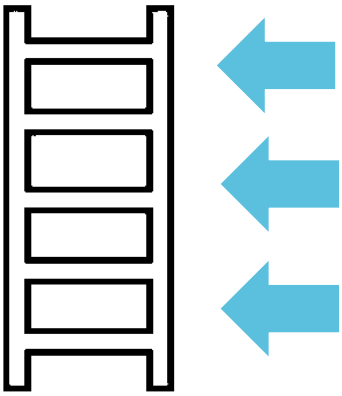
**Your findings will indicate the probability that the technology improved (or did not improve) outcomes by a certain amount.**

You will need to decide what impact you find meaningful and how certain you want to be that the technology caused the impact.



## Minimum meaningful impact (MMI)

This is the impact you would need to see to conclude the technology is moving the needle. Is the technology worth using if it improves outcomes by 5 points, 10 points, or some other value? When determining this, you may want to look at the overall range of outcomes for your assessment and the impact of similar technologies or interventions. You may also want to set a higher MMI for more expensive or higher-stakes technologies.




*A low-stakes technology might be one that doesn't require a major investment in technology infrastructure, one that fewer people use, or one that involves lower-priority outcomes.*

## Certainty

This is how confident you need to be that the technology improves outcomes by at least the minimum meaningful impact (MMI). Would you say the technology is working if you can be 75% sure it achieved the MMI, or do you want to be more certain? You may want to set a higher level of certainty for more expensive or higher-stakes technologies. However, higher thresholds are harder to meet and may increase the chance of getting inconclusive results.