



ELEVATING EVIDENCE

An Introduction to Study Design

Office of Continuous Improvement and Support

Objectives

- ❑ By the end of this webinar, participants will be able to:
 - ❑ describe the basic principles of study design;
 - ❑ identify key words related to different study designs; and
 - ❑ determine the significance of study findings.



Agenda

- Introduction to Study Design
- Alignment
- Experimental Study Design
- Quasi-Experimental Study Design
- Correlational Study Design
- Understanding Significance





Introduction: *Why does this matter?*

- ❑ Every Student Succeeds Act (ESSA)
- ❑ ESSA requires school improvement initiatives to be rooted in “evidence-based activities, strategies, or interventions.”
- ❑ A key component to understanding ESSA’s evidence provisions is developing an understanding of *study design*.



Introduction to Study Design

- ❑ Study designs provide a framework for the development and implementation of a study.
- ❑ Study designs create common language.
- ❑ There are many study designs and they have many purposes.
 - ❑ Three study designs are mentioned in [34 C.F.R. 77.1](#):
 - ❑ Experimental
 - ❑ Quasi-experimental
 - ❑ Correlational

Alignment

The study definitions referenced in this webinar are aligned to [34 C.F.R 77.1, “Non-Regulatory Guidance: Using Evidence to Strengthen Education Investments”](#) and the [“What Works Clearinghouse Standards Handbook” \(Version 4.0 Standards\)](#).

Table 1. Summary of Recommended Study Criteria for Each Evidence Level

	Strong Evidence	Moderate Evidence	Promising Evidence	Demonstrates a Rationale
Study Design	Experimental study	Quasi-experimental study	Correlational study with statistical controls for selection bias	Provides a well-specified logic model informed by research or evaluation
WWC Standard	Meets WWC Evidence Standards <u>without</u> reservations (or is the equivalent quality)	Meets WWC Evidence Standards <u>with</u> or <u>without</u> reservations (or is the equivalent quality)	N/A	N/A
Favorable Effects	Shows a statistically significant and positive (i.e., favorable) effect of the intervention on a student outcome or other relevant outcome	Shows a statistically significant and positive (i.e., favorable) effect of the intervention on a student outcome or other relevant outcome	Shows a statistically significant and positive (i.e., favorable) effect of the intervention on a student outcome or other relevant outcome	Relevant research or an evaluation that suggests that the intervention is likely to improve a student outcome or other relevant outcome
Other Effects	Is not overridden by statistically significant and negative (i.e., unfavorable) evidence from other findings in studies that meet WWC Evidence Standards with or without reservations (or are the equivalent quality)	Is not overridden by statistically significant and negative (i.e., unfavorable) evidence from other findings in studies that meet WWC Evidence Standards with or without reservations (or are the equivalent quality)	Is not overridden by statistically significant and negative (i.e., unfavorable) evidence from other findings in studies that meet WWC Evidence Standards with or without reservations (or are the equivalent quality)	An effort to study the effects of the intervention, ideally producing promising evidence or higher, will happen as part of the intervention or is underway elsewhere
Sample Size and Overlap	Includes a large sample and a multi-site sample, overlapping with populations <u>and</u> settings proposed to receive the intervention	Includes a large sample and a multi-site sample, overlapping with populations <u>or</u> settings proposed to receive the intervention	N/A	N/A





Experimental Study Design

Experimental Study Definition

- ❑ A study design in which two randomly assigned groups of study participants are compared to determine if an intervention was successful
 - ❑ One study group, the *intervention group*, **receives the intervention**.
 - ❑ The other group, the *control group*, does **not** receive the intervention.
 - ❑ By comparing the two groups, researchers are able to measure the effect of an intervention.



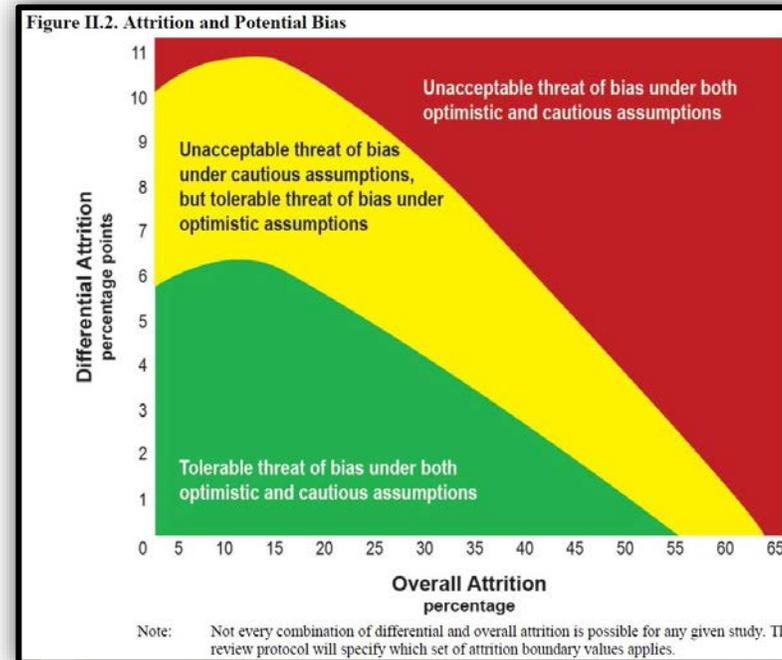
Key Characteristics

- ❑ The study design uses *random* assignment.
- ❑ Compares an intervention group to a control group
- ❑ Study participants can be treated as individuals or viewed as clusters.
- ❑ It is the most rigorous of study designs.



Be on the lookout!

- ❑ Compromised random assignment
- ❑ High levels of sample attrition
 - ❑ **Overall Attrition** – the progressive loss of data or subjects during a research study.
 - ❑ **Differential Attrition** – the absolute value of the attrition of the control group minus the attrition of the intervention group.





Quasi-Experimental Study Design

Quasi-experimental Study Definition

- ❑ A study design in which two previously assigned groups of study participants are compared to determine if an intervention was successful
 - ❑ One study group, the *intervention group*, **receives the intervention**.
 - ❑ The other group, the *control group*, does **not** receive the intervention.
 - ❑ By comparing the two groups, researchers are able to measure the effect of an intervention.





Key Characteristics

- ❑ Compares an intervention group to a control group
- ❑ Study participants can be treated as individuals or viewed as clusters
- ❑ Uses *previously assigned* groups
- ❑ Requires statistical controls to address bias

Be on the lookout!

- ❑ Baseline equivalence

- ❑ Confounding factors

- ❑ A confounding factor is a characteristic that is aligned to one group, but not the other.
 - ❑ This is very common in studies that assign classrooms to different conditions, because schools may group students by characteristics – such as putting lower-performing students with a more experienced teacher or assigning English learners (ELs) with a teacher who holds an extra credential.
 - ❑ This alignment creates a bias that influences the outcome of the study.





Correlational Study Design

Correlational Study Definition

- ❑ A study design that relies on...
 - ❑ observational data (collected by the researcher in a natural environment without interference),
 - ❑ archival data (publically available data reported by local and state education agencies) OR
 - ❑ survey data (collected by the researcher through anonymous surveying) to draw a statistical, or correlational, conclusion.





Key Characteristics

- ❑ Relies on observational, archival, or survey data
- ❑ Uses statistics to measure the correlation between two variables
- ❑ Correlation does **not** equal causation



Be on the lookout!

- ❑ Variable manipulation

- ❑ Confirmation and sampling bias

- ❑ *Confirmation bias* occurs when a researcher designs a study in such a way as to confirm a hypothesis.

- ❑ This is common in surveying, where questions may be worded in such a way as to lead study participants to a certain answer.

- ❑ *Sampling bias* occurs when a researcher selects certain types of data in hopes of finding certain answers.

- ❑ Inaccurate calculations



Understanding Significance

Sampling

- ❑ Large Sample

 - ❑ 350 or more students

 - ❑ 50 or more groups of 10 or more students

- ❑ Multi-site Sample

 - ❑ More than one site (LEA, locality, or state)

- ❑ Setting

- ❑ Population



Measurement

- ❑ Performance Measure – any quantitative indicator, statistic, or metric used to gauge program or project performance
- ❑ Relevant Outcome – the student outcome(s) (or ultimate outcome if not related to students), the proposed process, product, strategy, or practice is designed to improve; consistent with the specific goals of a program
- ❑ Causal Inference – the process of drawing a conclusion that an activity or intervention was likely to have affected an outcome

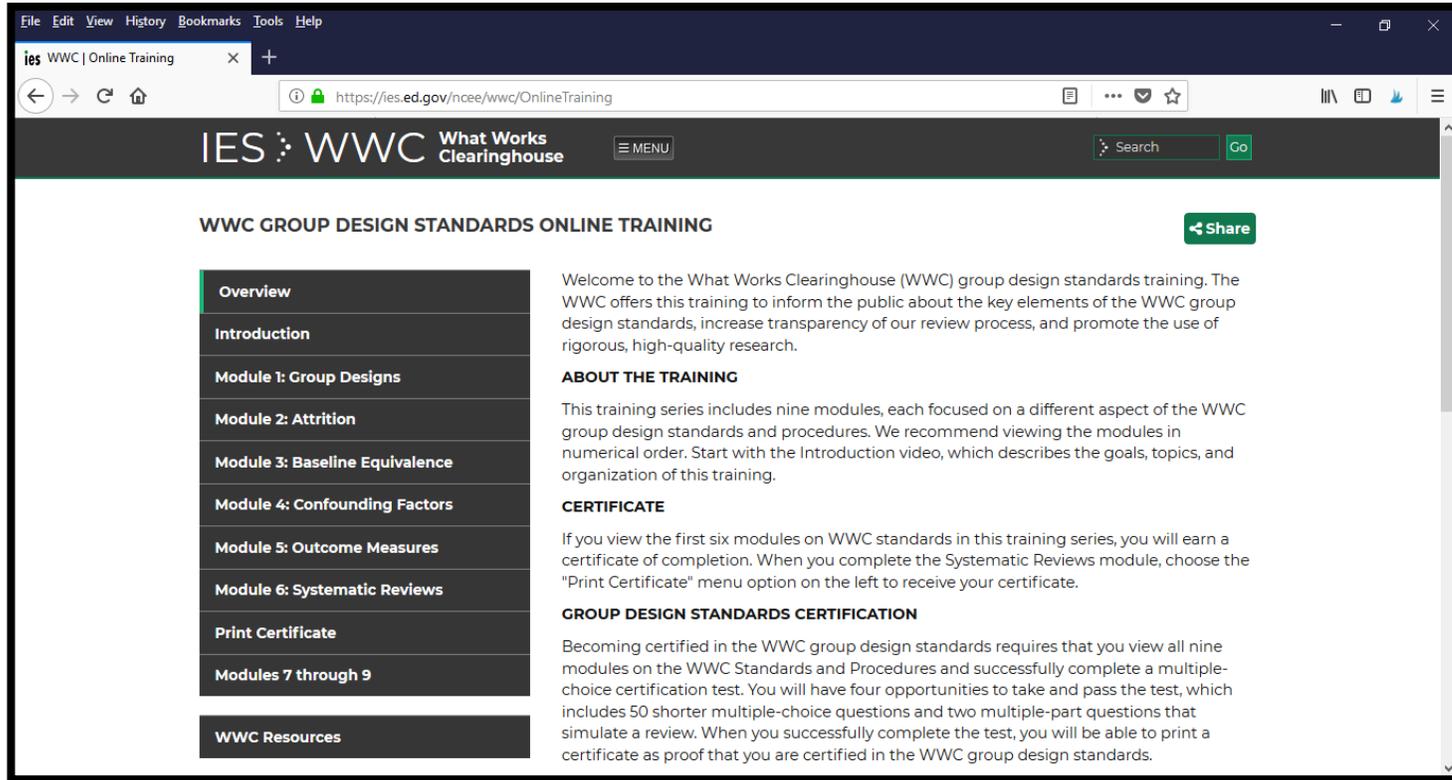


Statistics

- ❑ Reliability – the dependability or consistency of an instrument
- ❑ Validity – the quality or soundness of an instrument
- ❑ Standard deviation – the variability of a measure across the observations of a sample
- ❑ p-value – a statistical reporting measure used to describe outcome significance
- ❑ Null hypothesis – the hypothesis that there is no statistically significant relationship between two variables
- ❑ Effect size – a standardized measure of the magnitude of a difference



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WWC Resources

Welcome to the What Works Clearinghouse (WWC) group design standards training. The WWC offers this training to inform the public about the key elements of the WWC group design standards, increase transparency of our review process, and promote the use of rigorous, high-quality research.

ABOUT THE TRAINING

This training series includes nine modules, each focused on a different aspect of the WWC group design standards and procedures. We recommend viewing the modules in numerical order. Start with the Introduction video, which describes the goals, topics, and organization of this training.

CERTIFICATE

If you view the first six modules on WWC standards in this training series, you will earn a certificate of completion. When you complete the Systematic Reviews module, choose the "Print Certificate" menu option on the left to receive your certificate.

GROUP DESIGN STANDARDS CERTIFICATION

Becoming certified in the WWC group design standards requires that you view all nine modules on the WWC Standards and Procedures and successfully complete a multiple-choice certification test. You will have four opportunities to take and pass the test, which includes 50 shorter multiple-choice questions and two multiple-part questions that simulate a review. When you successfully complete the test, you will be able to print a certificate as proof that you are certified in the WWC group design standards.

Resources

- ❑ [“What Works Clearinghouse Standards Handbook” \(Version 4.0\)](#)
- ❑ [WWC Group Design Standards Online Training](#)
- ❑ [Code of Federal Regulations](#)
- ❑ [“Non-Regulatory Guidance: Using Evidence to Strengthen Education Investments”](#)





If you have questions regarding evidence-based interventions or study design, please contact the District 180 branch in the Office of Continuous Improvement and Support at (502) 564-2116.