

Game and Learn:
An Introduction to Educational Gaming
9. Games and Assessment

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Assessment and the Game Selection Process

Target Maximum Use of Game Features

- Match goals to:
 - Genre
 - Critical Gaming Analysis
 - Narrative Structure
 - Player Types
- Wherever possible, consider whether game events can be used for assessment purposes.

The Assessment Tools

Are Your Existing Assessment Tools a Good Match for the Task?

- *Yes, they are.*
 - What are the features of the tools that fully justify this answer?
- *No, they are not.*
 - Were the existing tools ever adequate?
 - Will you make new tools that you intend to apply to non-game courses?
 - Will they perform adequately there?

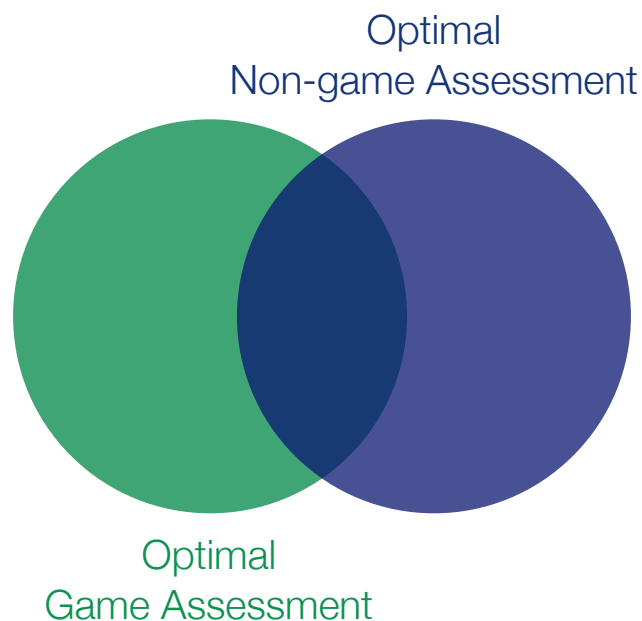
Bloom's Taxonomy – Cognitive Processes

Anderson & Krathwohl Revision (2001)	Characteristic Processes	
Create	<ul style="list-style-type: none"> • Generating multiple hypotheses based on given criteria • Designing a procedure to accomplish an untyped task • Inventing a product to accomplish an untyped task 	
Evaluate	<ul style="list-style-type: none"> • Testing for consistency, appropriateness, and effectiveness in principles and procedures • Critiquing the consistency, appropriateness, and effectiveness of principles and procedures, basing the critique upon appropriate tests 	
Analyze	<ul style="list-style-type: none"> • Distinguishing relevant/irrelevant or important/unimportant portions of material • Integrating heterogeneous elements into a structure • Attributing intent in materials 	
Apply	<ul style="list-style-type: none"> • Applying a procedure to a familiar task • Using a procedure to solve an unfamiliar, but typed task 	
Understand	<ul style="list-style-type: none"> • Paraphrasing materials • Exemplifying concepts, principles • Classifying items • Summarizing materials 	<ul style="list-style-type: none"> • Extrapolating principles • Comparing items
Remember	<ul style="list-style-type: none"> • Recalling memorized knowledge • Recognizing correspondences between memorized knowledge and new material 	

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Matching Existing Tools to New Assessment Requirements



Correcting for Expectation Effects

The Four Major Forms of Expectation Effects

- **The Placebo and Halo Effects**

- Placebo Effect: a technology has an effect, because the person interacting with that technology believes it will.
- Halo Effect: one aspect of a technology colors how other aspects of that technology are perceived, and consequently its effect.

- **The Hawthorne Effect**

- The fact that someone is exposed to a technological shift by itself can affect how they perform, regardless of the specifics of that technological shift.

- **The John Henry Effect**

- A group that is not exposed to a technological shift, and knows that another one is, may view itself as in competition with the latter group and change its performance accordingly.

- **The Pygmalion Effect**

- Teachers' expectations of the performance of their students will tend to determine their actual performance.

Controlling for Expectation Effects

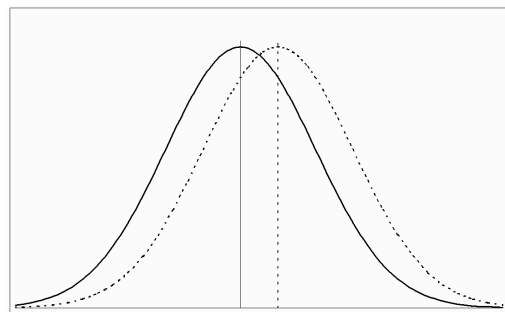
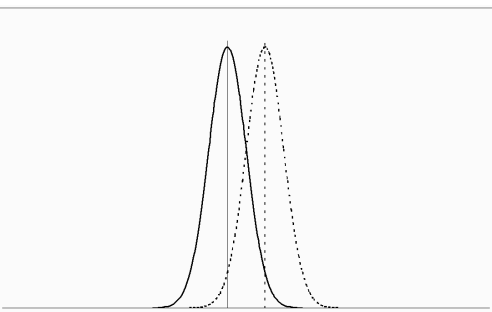
- Try to have multiple instructors use the technology
- Try to have multiple classes use the technology
- Have a third party observe instructors and classes
- Look for trends in class performance throughout the term
- Use end-of-term attitudinal surveys

Experimental Design

Groups	Teacher Expectation	
	Benefit	No Benefit
1. No-Treatment Control	A	B
2. Hawthorne Control	C	D
3. Experimental Procedure	E	F

Essential
Important
Desirable

Checking for Effect Size



Comparing Results

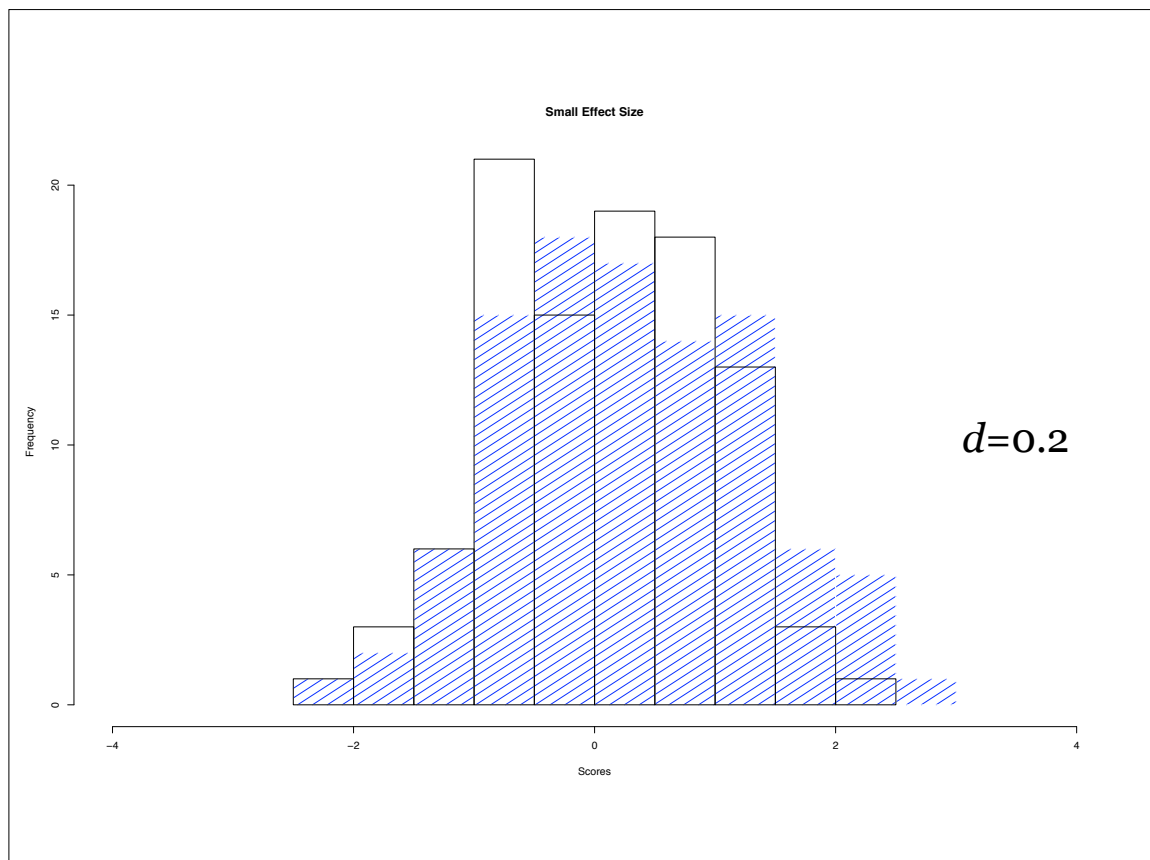
Cohen's Effect Size Index d

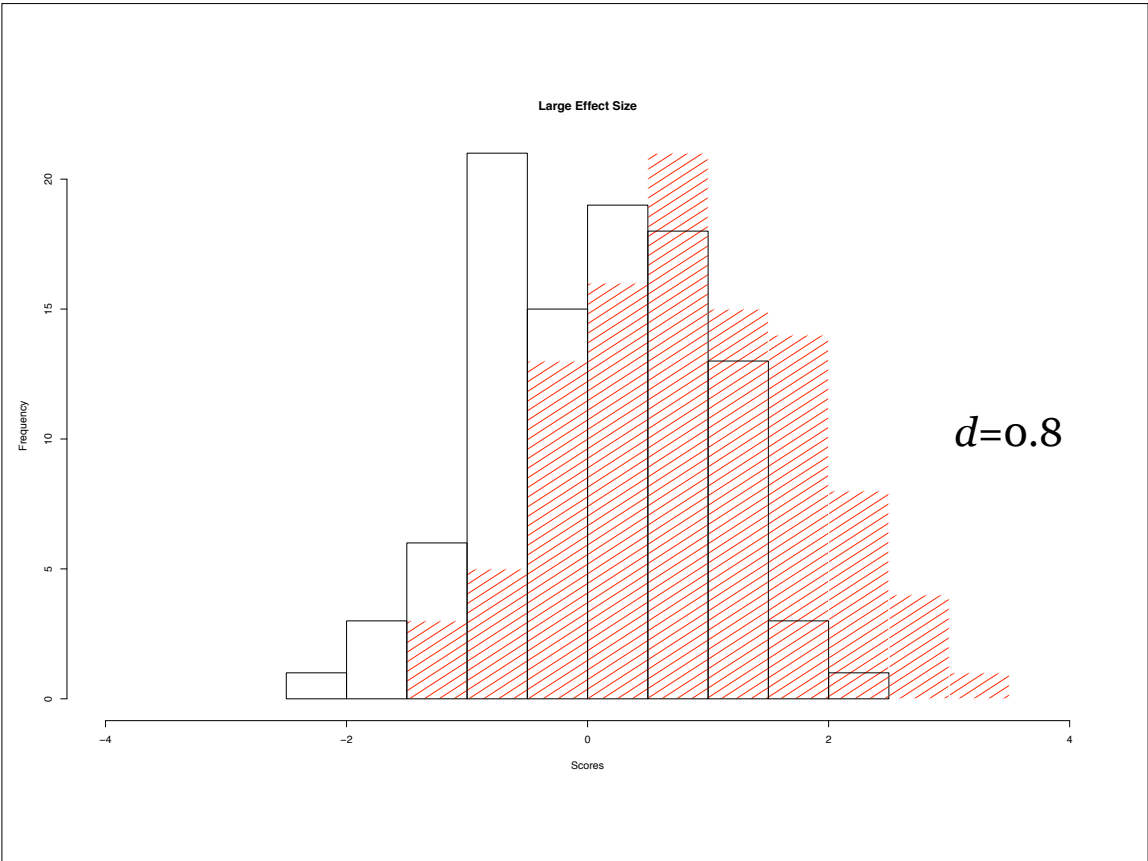
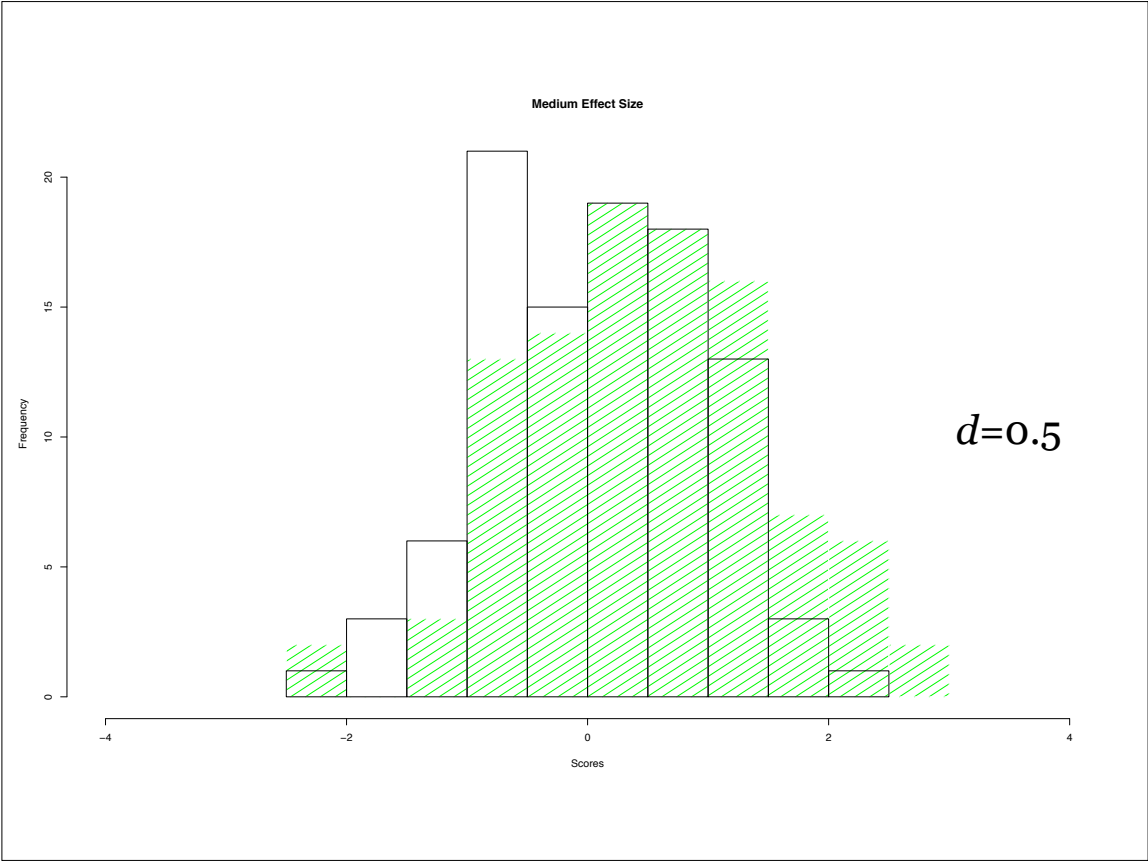
$$d = \frac{|m_A - m_B|}{\sqrt{\frac{(n_A - 1)\sigma_A^2 + (n_B - 1)\sigma_B^2}{n_A + n_B - 2}}}$$

m_A , m_B : mean scores for the two groups being compared

n_A , n_B : sample sizes for the two groups being compared

σ_A , σ_B : standard deviation of the scores for the two groups being compared





Resources Cited

- **The Assessment Tools:**

- Anderson, L.W. and D.R. Krathwohl, eds. *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives, Complete Edition*. Longman. (2000)

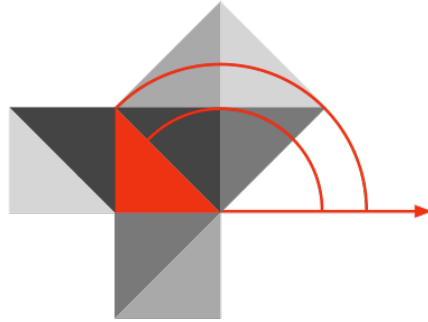
- **Correcting for Expectation Effects:**

- Draper, S.W. *The Hawthorne Effect*. Online at:
<http://www.psy.gla.ac.uk/~steve/hawth.html>
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- Rosenthal, R. *Experimenter Effects in Behavioral Research - Enlarged Edition*. Irvington Publishers, Inc. (1976) (See esp. Chapters 19-24)
- Rosenthal, R. and L. Jacobson. *Pygmalion in the Classroom: Teacher Expectation and Pupils' Intellectual Development*. Holt, Rinehart, and Winston, Inc. (1968) (See esp. Chapter 11)

- **Checking for Effect Size:**

- Coe, R. "It's the Effect Size, Stupid: What effect size is and why it is important." Paper presented at the *Annual Conference of the British Educational Research Association*. (2002) Available online at:
<http://www.leeds.ac.uk/educol/documents/00002182.htm>
- Cohen, J. *Statistical Power Analysis for the Behavioral Sciences*. Academic Press. (1969) (See esp. Chapter 2)

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