The Learning Research Quiz Show

with your host, Will Thalheimer, PhD

First Do No Harm
First Aim to Do Good
Use Scientific Research
Evaluate Honestly & Make Improvements

First Do No Harm

Bridging Gap between Research and Practice

Learning Evaluation

Research Translation
Slides available at:  www.is.gd/will999stuff
Question 1
You’ve got a 1-hour classroom training program just about developed. Then, senior management says they want a 90-minute program instead, with 30 minutes added after the first hour. For the last 30 minutes, what’s will be the best use of the time?

A. Add additional relevant content you couldn’t cover before.
B. Review key concepts from the first hour.
C. Ask questions about key concepts from the first hour.

Question 2
What if this was an elearning program? What would produce the best long-term remembering, EXTRA REVIEW or EXTRA QUESTIONS?

A. Extra Review will better support remembering.
B. Extra Questions (without feedback) will better support remembering.
C. Extra Questions (with feedback) will better support remembering.
Retrieval Practice vs. No Retrieval Practice


The Power of Retrieval Practice


Learning and Forgetting Curves

Question 3
When should we give learners feedback on quiz questions?

A. Immediately after each question.
B. Immediately after the end of the quiz.
C. After a delay of an hour or more.
D. After a delay of several days or more.
Gamification

A. Gamification has SOLID research backing.
B. Gamification has SHOWN to create benefits.
C. Gamification has FAILED to show benefits.
D. Gamification has NOT SHOWED CONSISTENT benefits.
E. Gamification IS DIFFICULT to research.
F. Gamification IS IMPOSSIBLE to research.

The Variety of Findings in Gamification Research


Gamification is NOT a THING!

https://is.gd/notathing
Question 5a
If we assumed the learning methods used in an elearning course and a classroom training course were the same, which would produce the best learning results?

A. eLearning
B. Classroom Training
C. Both will produce roughly equal learning results.

Question 5b
Comparing a typical elearning course and a typical classroom training course, which will produce the best learning results?

A. eLearning
B. Classroom Training
C. Both will produce roughly equal learning results.
elearning or classroom training

the learning factors that matter

Gamification

the learning factors that matter
Definitions and the Five Use Cases for Microlearning:
https://is.gd/microlearning

Does eLearning Work?
What the Scientific Research Says!
Research Compiled by Will Thalheimer, PhD

https://is.gd/elearning999
Question 3 -- REVISITED
When should we give learners feedback on quiz questions?

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B. Immediately after the end of the quiz.
C. After a delay of an hour or more.
D. After a delay of several days or more.

Question 6
When designing learning, should we base our learning methods on the preferences of our learners?

A. Learners are FAIRLY GOOD JUDGES of their own learning, so we should let them decide on how best to learn.
B. Learners are TOO OFTEN POOR JUDGES of their own learning, so we should guide their learning experiences.
We’d like to trust our learners...

Research shows that learners don’t always know their own learning...

**Learners are Overly Optimistic**
Zechmeister & Shaughnessy (1980).

**Learners can’t always Overcome Faulty Prior Knowledge**
Kendeou & van den Broek (2005).

**Learners Fail to Properly Use Examples**
Renkl (1997).

**Learners Fail to Give Themselves Retrieval Practice**
Karpicke, Butler, & Roediger (2009).

**Two Recent Reviews Emphasize Learners’ Lack of Knowledge of Learning**
Why do we do research?

To help us make good learning-design decisions!!!

To help us be effective!

Good Research

Apply with Practical Wisdom

Validate with Rigorous Evaluation

Poorly-Designed Research

Survey Research

Tentative Research

Confirmatory Research

Bad Research

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Question 7

Today, which type of research offers the most critical information for learning design?

A. Research examining LEARNING METHODS and their outcomes.

B. Research on BRAIN-BASED LEARNING and NEUROSCIENCE.

C. Research based on BIG DATA ANALYSES of training results.

D. We should be DOING ALL of these!
Someday, neuroscience may have a ton to teach us about learning.

Neuroscience Defined

“Neuroscience is the scientific study of the nervous system. It is a multidisciplinary branch of biology, that deals with the anatomy, biochemistry, molecular biology, and physiology of neurons and neural circuits.”

Wikipedia
"I don't think brain science has anything to say for business practice."

"We still don't really know how the brain works."

John Medina
Neuroscientist
June 2015
January 2018

“In general there are only two real conclusions we can make at present:

• For the time being, we do not really understand all that much about the brain.

• More importantly, it is difficult to generalize what we do know into a set of concrete precepts of behavior, never mind devise methods of influencing that behavior.”
“There are no examples of novel and useful suggestions for teaching based on neuroscience thus far.”

Question 7 -- Revisited
Today, which type of research offers the most critical information for learning design?

A. Research examining LEARNING METHODS and their outcomes.
B. Research on BRAIN-BASED LEARNING and NEUROSCIENCE.
C. Research based on BIG DATA ANALYSES of training results.
D. We should be DOING ALL of these!

To Learn More about Neuroscience and Learning

https://is.gd/brainlearning
QUESTION 8 – Are we as learning professionals more susceptible to recommendations if they mention “neuroscience” or “brain science?”

A. Yes, there is scientific evidence that people are more likely to believe arguments if they use scientific terminology.

B. No, this is an urban legend.

Question 9
In designing learning, should we take learner characteristics into account?

A. YES, We should provide different learning interactions based on learners’ different LEARNING STYLES.

B. YES, We should provide MULTIPLE TYPES of learning interactions to support all learners.

C. YES, We should provide different learning interactions based on learners differing PRIOR KNOWLEDGE.

D. We should do ALL OF THE ABOVE.
Science has proven: the learning-styles approach is not effective!

“We conclude therefore, that at present, there is no adequate evidence base to justify incorporating learning-styles assessments into general educational practice.”

Science has proven: the learning-styles approach is not effective!

Are learning-styles predictions validated by research?

"No. Several reviews that span decades have evaluated the literature on learning styles (e.g., Arter & Jenkins, 1979; Kampwirth & Bates, 1980; Kavale & Forness, 1987; Kavale, Hirshoren, & Forness, 1998; Pashler et al., 2009; Snider, 1992; Stahl, 1999; Tarver & Dawson, 1978), and each has drawn the conclusion that there is no viable evidence to support the theory.”

Question 10
Which of the following statements is true?

A. People remember 10% of what they READ.
B. People remember 20% of what they HEAR.
C. People remember 30% of what they SEE.
D. People remember 50% of what they SEE & HEAR.
E. All of the above.
F. None of the above.

"People remember 10% of what they read..."

Effective Learning
Per Cent of Knowledge Retained after Completion

- Teaching one-to-one: 90%
- Learning by doing: 75%
- Discussion group: 50%
- Demonstration: 30%
- Audio/Visual: 20%
- Reading: 10%
- Lecture: 5%

Source: National Training Laboratory, United States
1000ventures.com

Involving all senses increases learning effectiveness

*We remember by...*

- Reading, discussing and doing: 90%
- Reading and discussing: 70%
- Seeing: 30%
- Hearing: 20%
- Reading: 10%

Source: Forrester Research
Learning Styles Affected

Web Delivery Methods

Retention Rates

A B C D E F G

Retention percentage source:
HTL Institute from Retention Rates
From Different Ways of Learning.

Graphic Model:
Elaine Montembeau ©2000
Support Information:
Jannette Finch

Edgar Dale's Cone of Experience

People generally remember...
(learning activities)

10% of what they read
20% of what they hear
30% of what they see
50% of what they see and hear
70% of what they say and write
90% of what they do.

People are able to...
(learning outcomes)

Define
List
Describe
Explain

Demonstrate
Apply
Practice

Analyze
Define
Create
Evaluate

Design/Perform a Presentation - "Do the Real Thing"
Learning Pyramid

People Generally Remember:
- 10% of what they Read
- 20% of what they Hear
- 30% of what they See
- 50% of what they hear and see
- 70% of what they say and write
- 90% of what they do

People Are Able To:
- People Are Able To: (Learning Outcomes)
- Read
- Define List
- Describe Explain
- Hear
- Demonstrate Apply Practice
- View Images
- Watch Video
- Attend Exhibit/Sites
- Watch A Demonstration
- Participate in Hands-On Workshop
- Design Collaborative Lessons
- Analyze Design Create Evaluate
- Simulate or Model a Real Experience
- Design/Perform a Presentation - Do The Real Thing

Dale’s Cone of Experience
Retention Rates of Learning Methods

Learning is not a spectator sport.

Research shows people remember only 5% of what they hear in a lecture. But they retain 75% when they learn by doing.

HRDQ Experiential Learning Model™

Cone of Learning (Edgar Dale)

After 2 weeks we tend to remember...

- 10% of what we READ
- 20% of what we HEAR
- 30% of what we SEE
- 50% of what we HEAR and SEE
- 70% of what we SAY
- 90% of what we both SAY and DO

Nature of Involvement

- Verbal Receiving
- Visual Receiving
- Receiving / Participating
- Doing

Learning Pyramid

Average Retention Rate

- Lecture: 5%
- Reading: 10%
- Audio-Visual: 20%
- Demonstration: 30%
- Discussion Group: 50%
- Practice by Doing: 75%
- Teach Others/Immediate Use: 90%

Source: National Training Laboratories, Bethel, Maine
Dale’s Learning Cone

- 10% of what we read
- 20% of what we hear
- 30% of what we see
- 50% of what we hear and see
- 70% of what we say
- 90% of what we both say and do

Lots:
- Verbal Receiving (Passive)
- Visual Receiving
- Receiving and Participating (Active)
- Doing (HOTS)

- Reading
- Hearing Words
- Looking at Pictures
- Watching a Movie
- Looking at an Exhibit
- Watching a Demonstration
- Seeing It Done on Location
- Participating in a Discussion
- Giving a Talk
- Doing a Dramatic Presentation
- Simulating the Real Experience
- Doing the Real Thing

Read a book
- 10% of what we read

Listen to a trainer
- 20% of what we listen

Watch a figure
- 30% of what we watch

Watch a demo
- 50% of what we watch and listen

Have a conversation
- 70% of what we say

Practice the object of the training
- 90% of what we do

Say

Watch and Listen

Watch

Read

Do and Say
EDGAR DALE’S CONE OF LEARNING

YOU REMEMBER
- Define
- List
- Describe
- Explain

YOU ARE ABLE TO
- Demonstrate
- Apply
- Practice

PASSIVE LEARNING
- View images
- Watch videos
- Exhibitions
- Watch a Demonstration
- Participate in Hands-On Workshops
- Design Collaborative Lessons
- Simulate a Model or Experience a Phenomenon
- Design/Perform a Presentation/Experiment

ACTIVE LEARNING
- *of what you read
- *of what you hear
- *of what you see
- *of what you see and hear
- *of what you say and write

Cone of Learning (Edgar Dale)

After 2 weeks we tend to remember...

<table>
<thead>
<tr>
<th>Nature of Involvement</th>
<th>Process</th>
</tr>
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<tbody>
<tr>
<td>Verbal Receiving</td>
<td>Reading</td>
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<tr>
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<td></td>
<td>Simulating the real experience</td>
</tr>
<tr>
<td></td>
<td>Doing the real thing</td>
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</table>

10% of what we READ
20% of what we HEAR
30% of what we SEE
50% of what we HEAR and SEE
70% of what we SAY
90% of what we both SAY and DO

The Cone of Learning

I see and I forget.
I hear and I remember.
I do and I understand.
— Confucius

www.Debunker.Club


www.is.gd/BadCone
Evaluation

The Kirkpatrick Four-Level Model

- Level 1: Reaction
- Level 2: Learning
- Level 3: Behavior
- Level 4: Results
The Kirkpatrick-Katzell Four-Level Model

Level 1: Reaction
Level 2: Learning
Level 3: Behavior
Level 4: Results

"The Kirkpatrick framework has a number of theoretical and practical shortcomings."

"[It] is antithetical to nearly 40 years of research on human learning, leads to a checklist approach to evaluation (e.g., 'we are measuring Levels 1 and 2, so we need to measure Level 3'), and, by ignoring the actual purpose for evaluation, risks providing no information of value to stakeholders." (p. 91)
“Kirkpatrick's framework is not grounded in theory and the assumptions of the model have been repeatedly disproven over the past 25 years…


Sitzmann and Weinhardt (in press from 2017)
Question 6 -- REVISITED
When should we give learners feedback on quiz questions?

A. Immediately after each question.
B. Immediately after the end of the quiz.
C. After a delay of an hour or more.
D. After a delay of several days or more.


Results (retrieval after 3 days)

Look deeper than the labels

Research can help us

Do rigorous evaluation

Look for the learning factors that matter

Be skeptical

Learners don’t always know

Myths are ubiquitous

Look to support remembering

Leadership can create benefits

People do not forget at one rate

Immediate feedback NOT always best

Objectives guide learner attention

Objectives help on targeted information

Leadership can create benefits

Brainstorming individually is better

Myers Briggs NOT valid, NOT reliable

Spacing repetitions helps remembering

Most smile sheets can be improved

Gamification is NOT a thing

Interviews may NOT help, BUT can be better

Kirkpatrick model goes against the research

Inserting tests provides retrieval practice

Neuroscience and learning: NOT ready

Gamification research is just getting started

Adding eLearning may NOT reduce budget

Objectives guide two groups of people

Brain training does NOT work

70/20/10 – The research is dodgy

Seek research, be skeptical

Learning styles is a myth to avoid

70/20/10 – The research is dodgy

Smile sheets are NOT effective

Leadership can create benefits

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Seek research, be skeptical
Why do we do research?

- To be effective
- To avoid myths
- To stop wasting money and effort

Debunking the Myths Books
The Learning Research Quiz Show
with your host,
Will Thalheimer, PhD

Phone: +1-617-718-0767
Email: info@WorkLearning.com
Website: WorkLearning.com
Book: SmileSheets.com
Twitter: @WillWorkLearn

Slides available at:
www.is.gd/will999stuff

Backed by Good Research?

- Myers Briggs Type Indicator (MBTI)
- Brain Training (Lumosity, Elevate, Peak)
- 70/20/10 (experience, people, training)
- Adding Competition to Learning
- Giving Learners Control in eLearning
Myers-Briggs Type Indicator

Cautionary Comments Regarding the Myers-Briggs Type Indicator

David J. Pittenger  The University of Tennessee at Chattanooga

The Myers-Briggs Type Indicator (MBTI) is a popular measure of personal preference that its promoters claim has many applications. McCaulley (2000) offered an optimistic and enthusiastic account of how counselors can use this instrument in corporate settings. The present article evaluates several of the psychometric limitations and criticisms of the MBTI that warrant considerable caution when making inferences from its 4-letter type formula. The author concludes that the MBTI, while offering much intuitive appeal, may not yet be able to support the claims its promoters make.

McCaulley (2000) recently provided an optimistic and enthusiastic account of how consulting psychologists can and should integrate the Myers-Briggs Type Indicator (MBTI) into consulting work with business management. More specifically, she suggested that consulting psychologists can guide people to identify their type and assist them in making decisions that affect the course of people’s lives, like workplace hiring and promotions.

Personality tests are popular, but do they capture the real you? Twelve years ago, I tried to drive a stake into the heart of the personality-testing industry. Personality tests are neither valid nor reliable, I argued, and we should stop using them—especially for making decisions that affect the course of people’s lives, like workplace hiring and promotions.

Intuition may steer you wrong

One of the implications of this research is that people are going to have a hard time leaving behind the bad ideas baked into popular yet unscientific personality assessments. The most notable example is the Myers-Briggs Type Indicator, which infamously remains quite popular while doing a fairly poor job of assessing personality, due to longstanding issues with the assessment itself and the long-discredited Jungian theory behind it. Our findings suggest that Myers-Briggs-like assessments that have largely been debunked by experts might persist in part because their formats overlap quite well with people’s intuitions about what will best access the “true self.”
Brain Training

Working Memory Training Does Not Improve Performance on Measures of Intelligence or Other Measures of "Far Transfer": Evidence from a Meta-Analytic Review

Monica McCleary, Thomas A. Beidel, and Charles Rados

Abstract

It has been claimed that working memory training programs produce cognitive benefits. This article presents a meta-analysis of working memory training studies with a post-hoc design and a control group that have examined participants' performance on measures of intelligence or other measures of "far transfer." The results of this analysis suggest that working memory training programs do not produce meaningful improvements in measures of intelligence transfer (word-reading comprehension, word comprehension, word fluency, and word generation) or other measures of "far transfer." No significant effects were observed in measures of intelligence transfer or other measures of "far transfer." Therefore, the results of this analysis suggest that working memory training programs do not produce meaningful improvements in measures of intelligence transfer or other measures of "far transfer." The authors conclude that the findings from this study are not generalizable to other working memory training programs that do not generate meaningful improvements in measures of "far transfer." These results naturally question the practical and theoretical importance of more comprehensive working memory training programs and the need for more research in this area.

Keywords: working memory, training, meta-analysis, outcomes

A Systematic Review of Commercial Cognitive Training Devices: Implications for Use in Sport

David A. Harris, Mark R. Wilson, and Samuel J. Vree

Background: Cognitive training (CCT) aims to develop a range of skills, like attention and decision-making, through targeted training of core cognitive functions. While CCT can target specific skills, like movement anticipation, research CT is domain general, focusing on core abilities (e.g., selective attention) for transfer to a range of real-world tasks, such as spotting opponents. Commercial CT (CCT) devices are highly appealing for athletes and coaches due to their ease of use and eye-catching marketing claims. The extent to which this training transfers to performance in the sporting arena is, however, unclear. Therefore, this paper sought to provide a systematic review of evidence for beneficial training effects of CCT devices and evaluate their application to sport.

Results: The review of evidence showed limited support for far transfer benefits from CCT devices to sporting tasks; mainly because studies did not target the sporting environment. Additionally, a number of methodological issues with the CCT literature were identified, including small sample sizes, lack of retention tests, and limited replication of findings by researchers independent of the commercial product. Therefore, evidence for sporting benefits is currently limited by the paucity of representative transfer tests and a focus on populations with health conditions.

Conclusions: Currently there is little direct evidence that the use of CCT devices can transfer to benefits for sporting performance. This conclusion, however, stems more from a lack of experimental studies in the sporting field and a lack of experimental rigor, rather than convincing null effects. Subsequently, there is an opportunity for researchers to develop more reliable findings in this area through systematic assessment in athletic populations and major methodological improvements.
“It’s not about the numbers!”

Charles Jennings


Learner Control

Found learner control useful when it enabled learners to go back and study correct procedures while practicing.

Backed by Good Research?

- Myers Briggs Type Indicator (MBTI)
- Brain Training (Lumosity, Elevate, Peak)
- 70/20/10 (experience, people, training)
- Adding Competition to Learning
- Giving Learners Control in eLearning
- Being Skeptical, Using the Research, Validating with Good Evaluation
Bonus Question 2

Repetition has powerful benefits for learning, if it isn’t rote, boring, or irrelevant. What’s the best way to support remembering with repetitions?

A. Repeat concepts fairly CLOSE IN TIME so that learners can easily process the material.
B. Repeat concepts at FAIRLY WIDE INTERVALS to strengthen long-term memory.
C. Repeat concepts at a slight delay, getting the BENEFITS OF BOTH short and long delays.

Spaced Repetitions Help!

Spaced Learning with Single Repetitions

Remembering the gist of sentences that were studied once or twice


Bonus Question 3
Can we use the word “UNDERSTAND” in a learning objective?
Who are our objectives for?

Learning Professionals

Learners

Video on Learning Objectives:
www.is.gd/LOBJ_VIDEO

Bonus Question 4 – Which Learning Design will produce Greater Remembering?

<table>
<thead>
<tr>
<th>NO EXTRA TEST</th>
<th>Learn Content</th>
<th>4 Days Go By</th>
<th>Final Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXTRA TEST</td>
<td>Learn Content</td>
<td>2 Days Go By</td>
<td>Test</td>
</tr>
</tbody>
</table>
Adding Retrieval Practice


Bonus Question 5
How much are learner-feedback questions correlated with learning outcomes?

A. High marks indicate that the training was likely to be VERY SUCCESSFUL in creating learning.

B. High marks indicate that the training was likely to be at least SOMEWHAT SUCCESSFUL in creating learning.

C. High marks on smile sheets tell us VERY LITTLE about the success of our training programs in creating learning.
Smile Sheets to Learning

Weak Relationship is below .30 and .09 is VERY WEAK

So...SMILE SHEETS tell us VERY LITTLE about Learning


1990’s


2000’s

Quite simply, the BEST book on smile sheet creation and utilization, Period!

Karl M. Kapp
Professor of Instructional Technology
Bloomsburg University

Thoughtful and sensible advice for feedback tools that will provide valid and actionable data.

Robert O. Brinkerhoff
Professor Emeritus, Western Michigan University
& Director, Brinkerhoff Evaluation Institute

Evidence-based practice at the master level.

Julie Dirksen
Author of Design For How People Learn