



# Transformative Active Learning

Fostering deep and flexible learning through the making of meaning

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What we process we learn.





Cognitive  
(thinking)

Behavioral  
(doing)

What we process  
we learn.

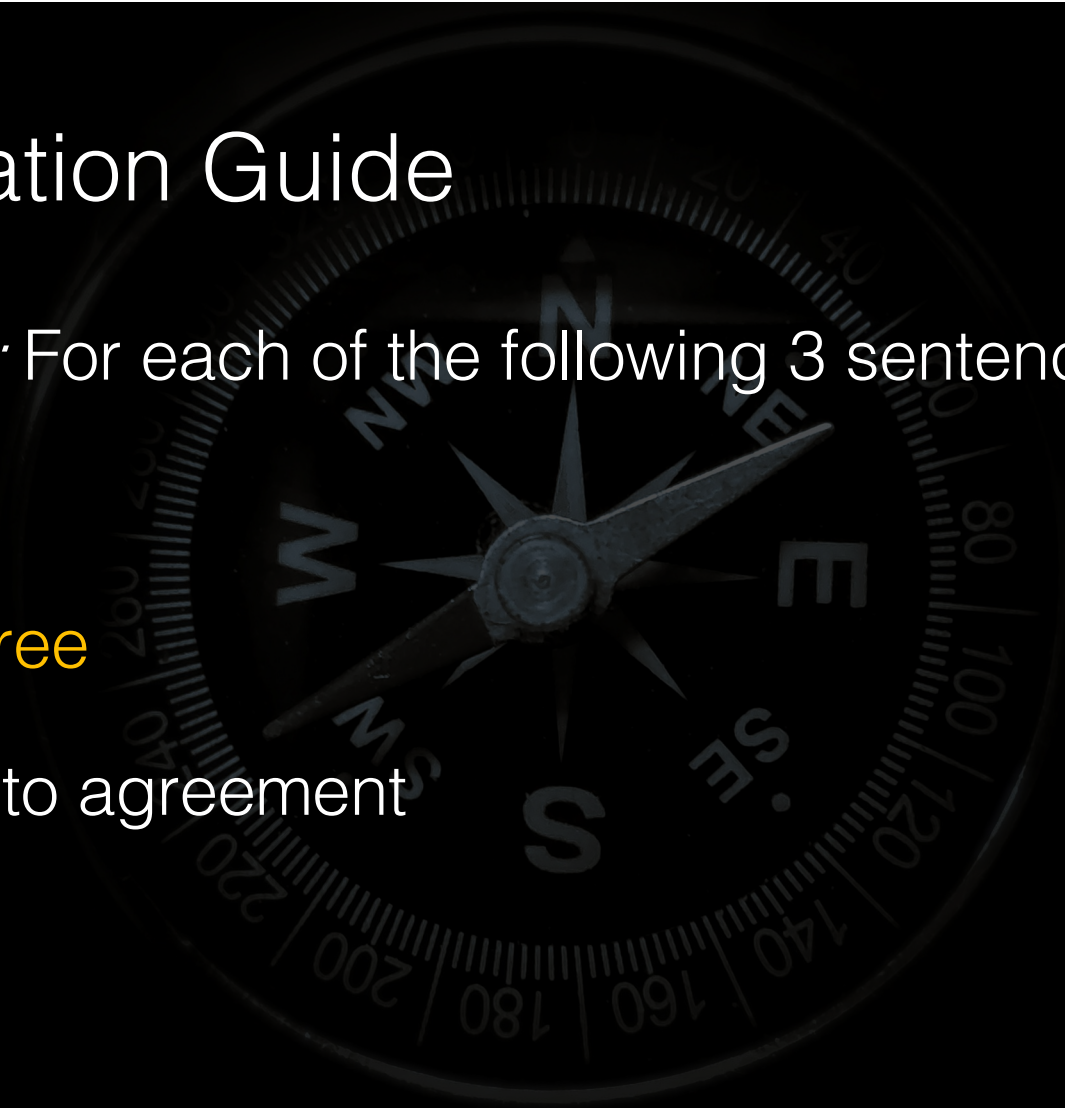
Affective  
(emoting)

Social  
(interacting)

# Anticipation Guide

*Directions:* For each of the following 3 sentences,

- Agree
- Disagree
- Edit into agreement





# Anticipation Guide



1. Active learning involves students doing things and thinking about the things they are doing.
2. Active Learning-based classes result in more student learning than lecture-based classes.
3. Active Learning works best in small STEM classes focused on problem solving.



What is active learning?



# Active Learning & Transformative Learning

- Formal Course Learning
- Instructional Strategies

Agency • Identity • Learning Communities • Problem Posing • Authentic Assessment • Experiential Learning • International Sojourning • Communities of Inquiry • Equity • Inclusion • Gameful Design • Inclusion • **Transformative Learning** • Online Learning • Reflective Action • Civil Dialogue • Intercultural Competency • General Education • Design Principles • Virtual Reality • Logic Models • Storytelling • A Planetary View • Service Learning • Study Abroad • Reflection • Self-Efficacy • Critical Thinking • Empathy • Love



# Active Learning



# Active Learning: A Beginning

Freeman et al. (2014)

Active Learning vs Lecture Courses  
UG STEM Courses  
Exam Scores & DFW Rates

- AL → ↑ Exams & ↓ DFWs

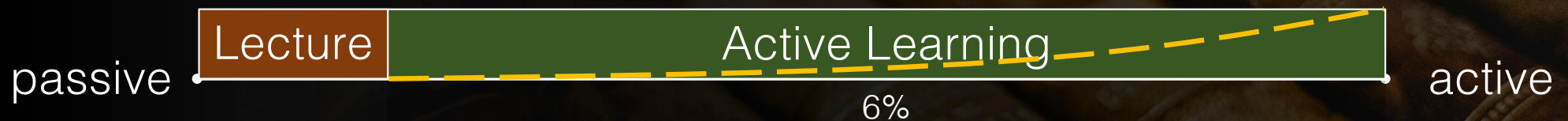
Theobald et al. (2020)

Active Learning vs Lecture Courses  
UG STEM Courses  
Exam Scores & DFW Rates

- AL → ↑ Exams & ↓ DFWs
- Larger gains for students from underrepresented groups (narrowed achievement gap)



# Freeman et al. (2014) & Theobald et al. (2020)



This study's intent was to evaluate the average effect of **any** active learning type . . . contrasted with traditional lecturing.

( Freeman et al., 2014, p. 8414 )



# What is Active Learning?

As impressive as they are, the results just cited cannot provide the kind of evidence-based guidelines that individual teachers need to decide whether to use active learning methods in their own courses.

Bernstein, 2018, p. 292

# What is Active Learning?

First Generation Active Learning Research

Second Generation Active Learning Research

Bernstein, 2018

Freeman et al., 2014

Streveler & Menekse, 2017



# What is Active Learning?

An Anti-Example







# What is Active Learning?

How does published research define AL?

Driessen et al., 2020

Doolittle et al., 2022

Biology Ed

Across Domains

2016-2018

2017-2022

Articles Addressing  
Inclusion Criteria →

148 articles

586 articles

No Definition

83.5%

70.1%

Definition

16.5%

29.9%

# What is Active Learning?

Qualitative Analysis : 161 Definitions – 3 Themes

1. Active learning as grounded in **student-centered constructivist theory**.
2. Active learning promotes **higher-order thinking** and **deeper learning**.
3. Active learning as an instructional strategy involving **activity**, **participation**, and **engagement**.



# What is Active Learning

## Domains

accounting

biology

biomedical education

calculus

chemical education

chemistry

computer science

construction management

cybersecurity

economics

education

engineering

English as a FL

geosciences

health sciences

Info technology

library science

mathematics

medical education

moral education

nutrition education

pharmacy education

philosophy

physical therapy

physics

political science

quantum field theory

recreational therapy

STEM

transportation

Active learning is not domain specific.



# What is Active Learning?

## Strategies

case-based learning

clickers

concept-point-recovery

controversial issues

cooperative learning

debate

design-based learning

discussion

dramatization

films

flipping

focused listening

group work

inquiry-based learning

jigsaw

laboratory learning

minute papers

music

online forums

peer instruction

flipping the class

questioning

reflection journals

role play

serious games

service learning

simulations

social media

student presentations

team-based learning

Active learning is not a strategy.



# What is Active Learning?

# Application

flipping the class

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Active learning is NOT a strategy.

# What is Active Learning?

Active learning is not domain specific.

Active learning is not a strategy.

So, what is it?



Active learning is deep and flexible  
cognitive, behavioral, social, and affective *processing*  
of one's new and prior knowledge and experience.

Question  
↓

Think-Pair-Share

PROCESSING



Retrieve Relevant Prior Knowledge  
Make Meaning of the Question  
Generate a Response  
Organize an Expression  
Express the Response

Read Other for Understanding  
Re-Generate a Response  
Re-Express, as Needed

Listen to Other's Response  
Make Meaning (questions?)  
Compare Self/Other Meanings  
Go back to #1

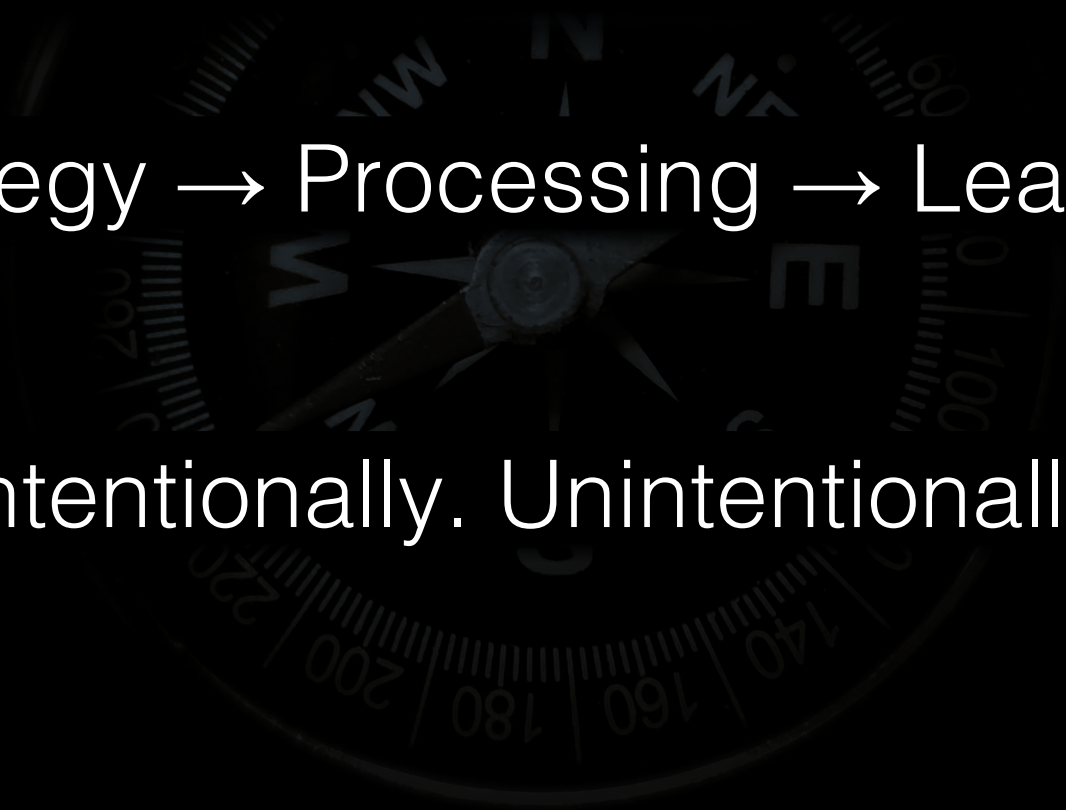
Learning



What we process we learn.

Strategy → Processing → Learning

Intentionally. Unintentionally.



Let's See



Word Pairs: Follow Your Directions

~~Word Pairs: Follow Your Directions~~

That's it!

Let's See What You Remember

What is the difference between a positive and a negative correlation?

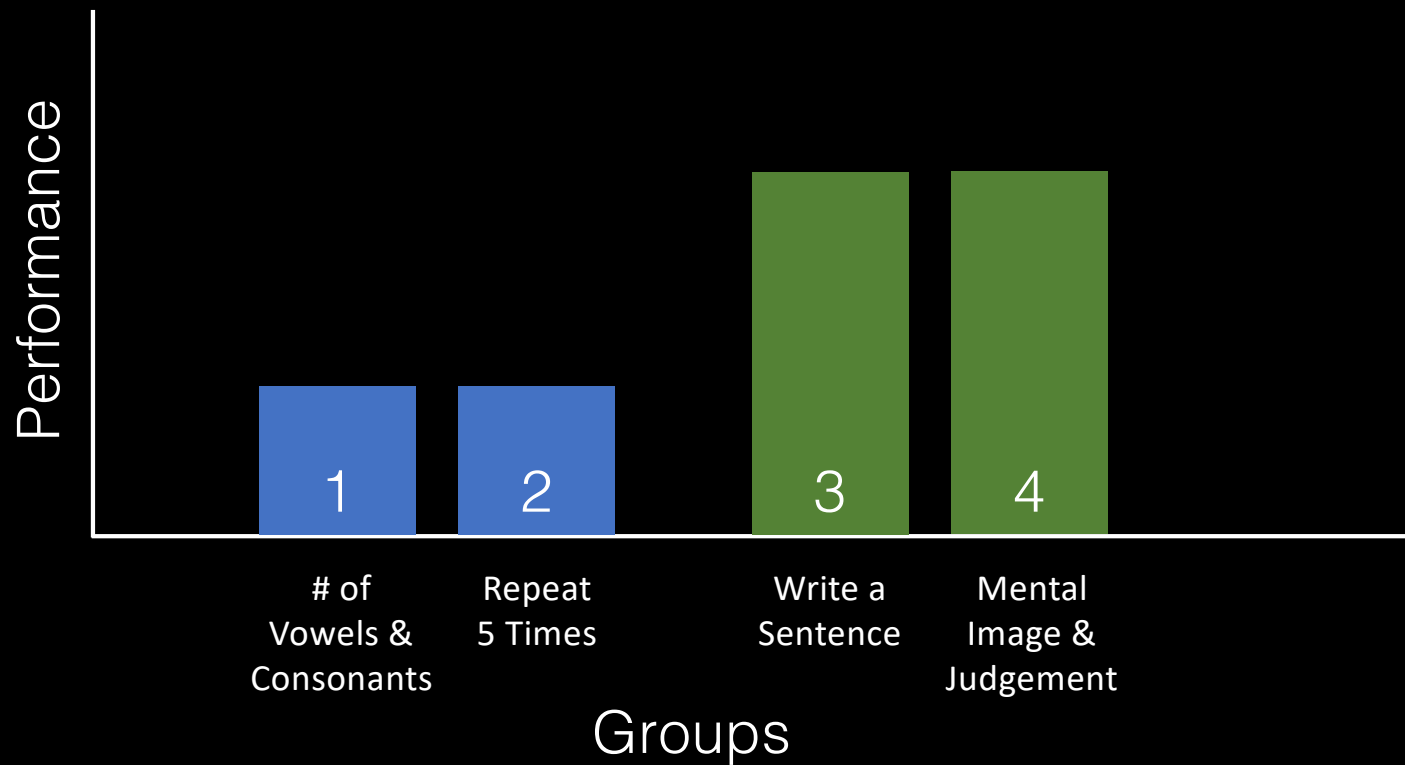
That's it!

Word Pairs: Check Your Responses

~~Word Pairs: Check Your Responses~~

That's it!

# Memory & Meaning



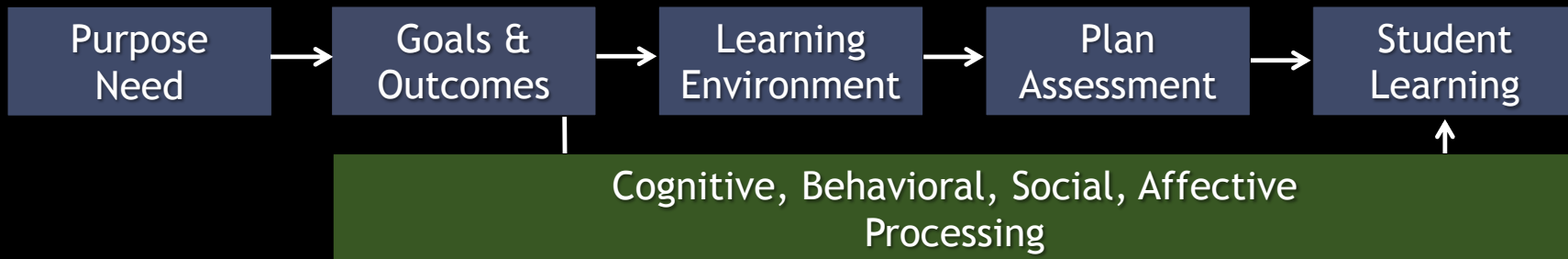


What we process we learn.



# Backwards Design

## alignment





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Fostering deep and flexible learning through processing

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