

8-9-2022

## Technology-Enabled Active Learning in Gen Ed Courses

Emily Faulconer

*Embry-Riddle Aeronautical University, [faulcone@erau.edu](mailto:faulcone@erau.edu)*

Follow this and additional works at: <https://commons.erau.edu/publication>



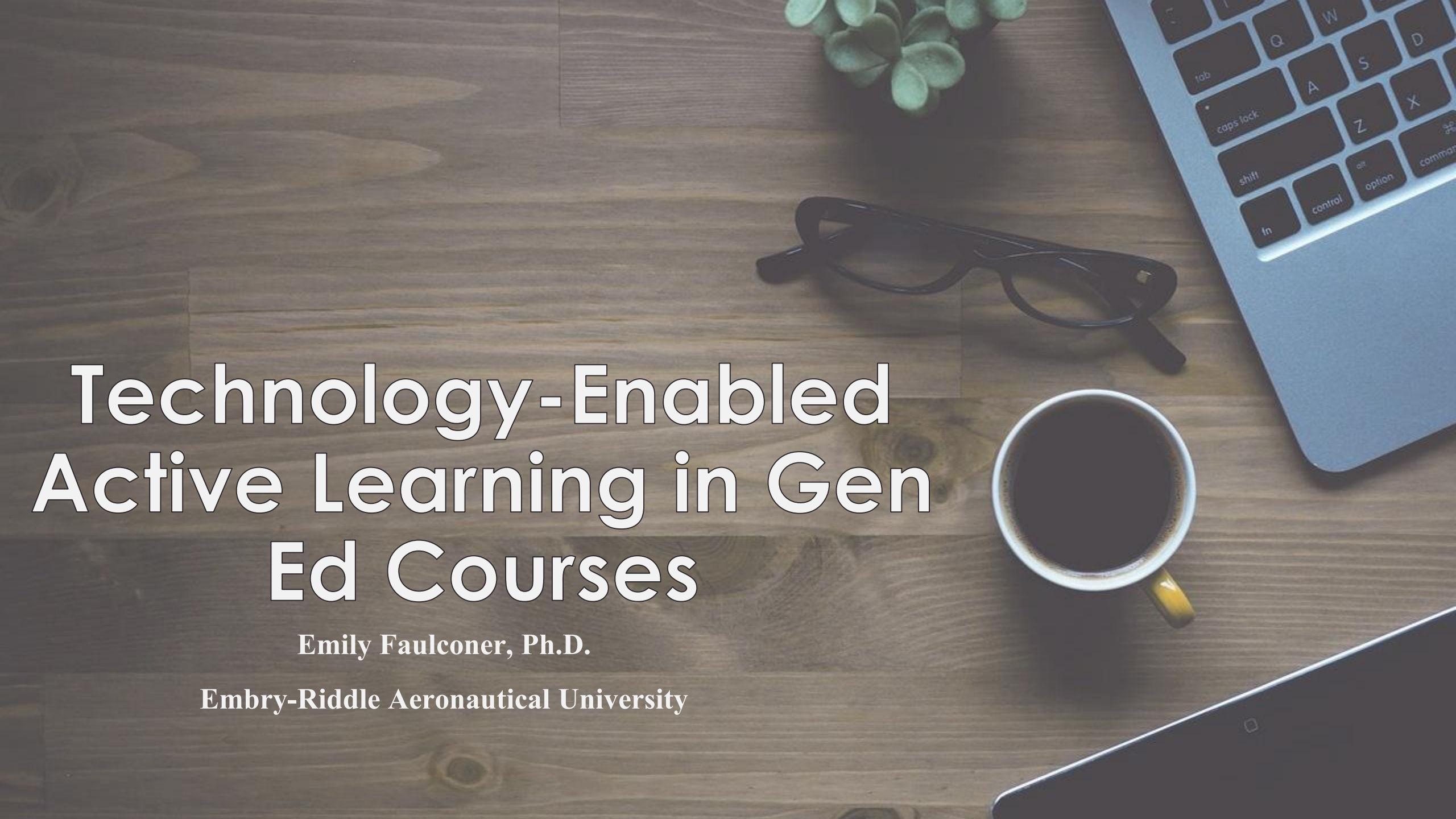
Part of the [Educational Methods Commons](#), [Educational Technology Commons](#), and the [Higher Education Commons](#)

---

### Scholarly Commons Citation

Faulconer, E. (2022). Technology-Enabled Active Learning in Gen Ed Courses. , (). Retrieved from <https://commons.erau.edu/publication/1999>

This Presentation without Video is brought to you for free and open access by Scholarly Commons. It has been accepted for inclusion in Publications by an authorized administrator of Scholarly Commons. For more information, please contact [commons@erau.edu](mailto:commons@erau.edu).

A top-down view of a wooden desk. In the upper right corner, a portion of a silver laptop is visible, showing keys like 'tab', 'Q', 'W', 'A', 'S', 'D', 'caps lock', 'Z', 'X', 'shift', 'control', 'option', and 'command'. Below the laptop, a pair of black-rimmed glasses lies horizontally. To the right of the glasses is a white coffee cup with a yellow handle, filled with dark coffee. In the top center, a small green succulent plant is visible. The background is a light-colored wooden surface with a prominent grain pattern.

# Technology-Enabled Active Learning in Gen Ed Courses

**Emily Faulconer, Ph.D.**

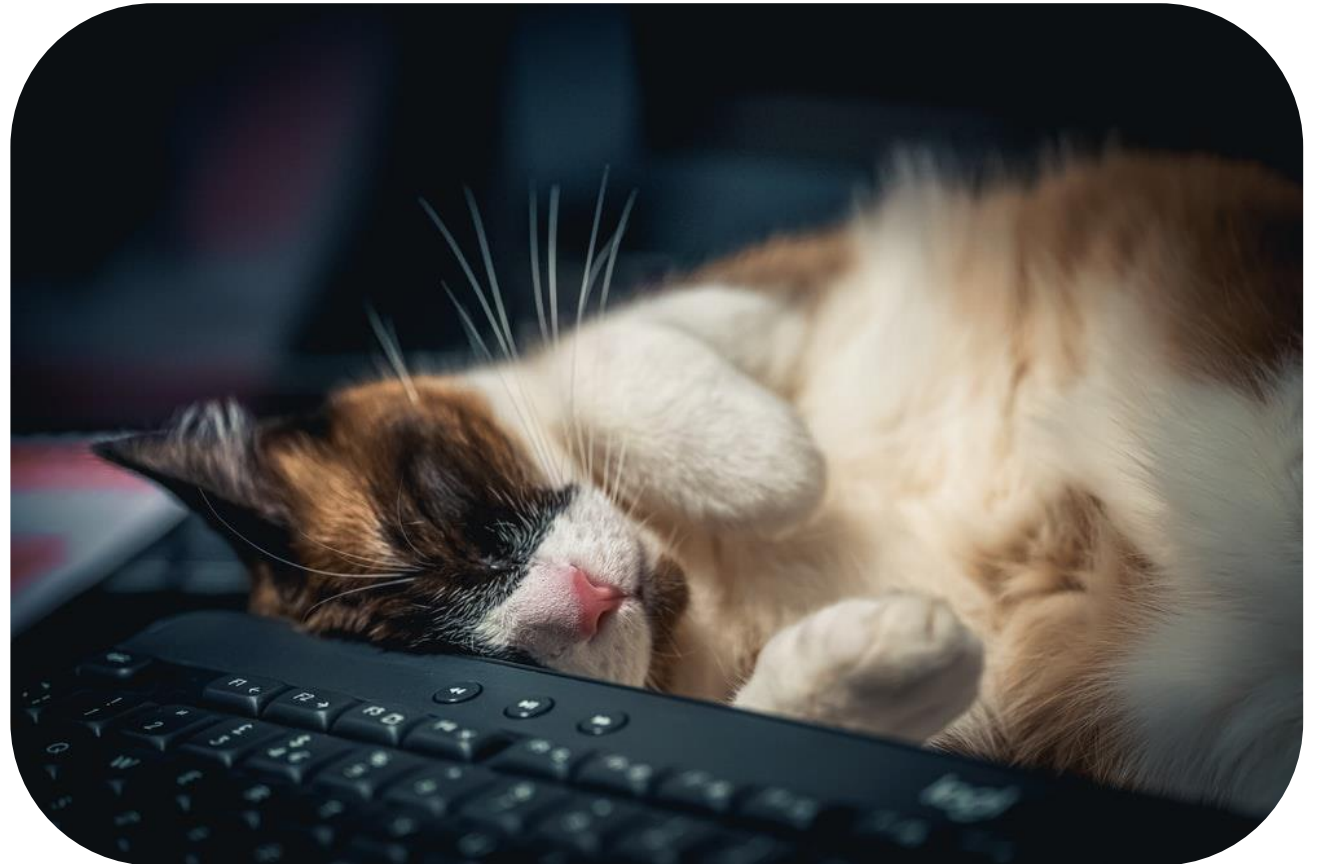
**Embry-Riddle Aeronautical University**

Asynchronous online courses tend to lack a true “lecture”.

Textbook reading



Videos

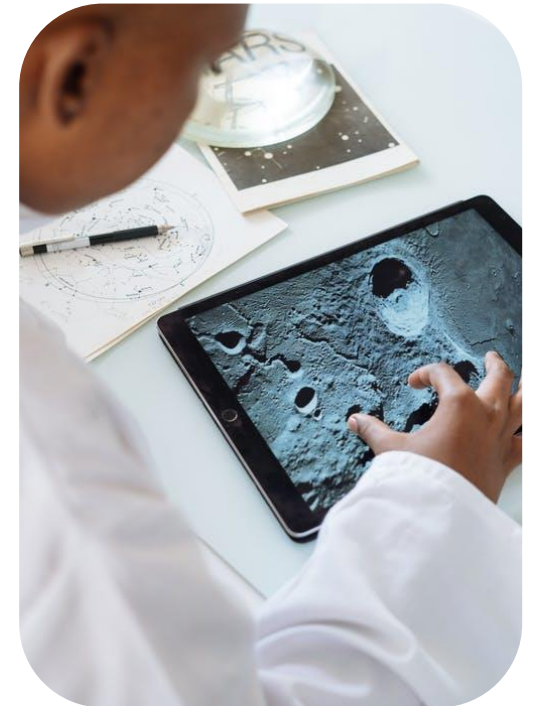


# In STEM, when communication of content engages students, learning is more effective.

[Bada & Olusegun \(2015\)](#)

[Cotner et al. \(2013\)](#)

[Freeman et al. \(2014\)](#)



# Engagement can take several forms.

**Active** – students interact with content but do not generate new material or information

**Constructive** – students generate material based on information received

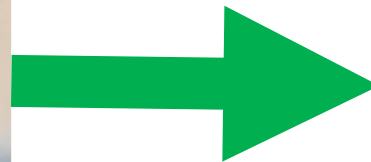
**Interactive** – students exchange ideas with all contributing





# H5P is an ed tech tool that can help!

Instructor-generated HTML5 assets to promote self-paced, self-directed active learning.



# You can still present *your* content.

- Text
- Video or audio
- Images
- Hyperlinks

The components of some mixtures can be easily identified while others cannot.

## Homogeneous

Uniform composition



Copper + Zinc = Brass

This homogeneous mixture is called a **solution** because its constituents are evenly distributed and will not separate out over time.



Orange Juice

## Heterogeneous

Varied composition



Sand, magnified

This heterogeneous mixture is called a **suspension** because its constituents will separate out over time ... that's why you shake dressing!



Homemade Salad Dressing



...while also embedding active engagement.

- Drag & Drop
- Drag the Word
- Multiple choice
- Image hotspot
- Fill in the blank (basic and advanced)
- T/F
- Image sequencing
- Mark the words
- Essay
- Image pairing

The screenshot shows an interactive learning interface titled "Drag and Drop" with the instruction "Match the images under the labels". It features three categories: "Pure Substance", "Homogeneous Mixture", and "Heterogeneous Mixture", each with a corresponding empty box. Below these are three image cards: "Cereal" (a bowl of colorful cereal), "Steel (iron and carbon)" (a stack of metal bars), and "Gold" (a piece of yellow metal). A "Check" button is located at the bottom left. At the bottom of the screen, there is a navigation bar with a progress indicator showing "6 / 36" and a star icon.

Drag the grey bullet to where there is a violation of Aufbau's Order of Filling.



Check



Knowledge checks with immediate feedback and unlimited attempts provide constructive engagement.

There are \_\_\_ valence electrons in an aluminum atom.

↑↓ ↑↓ ↑↓ ↑↓ ↑↓ ↑↓ ↑      

1s    2s            2p            3s            3p

3

✗ 5

Aluminum tends to form an ion with a +3 charge so it can achieve the electron configuration of neon. Now we see why!

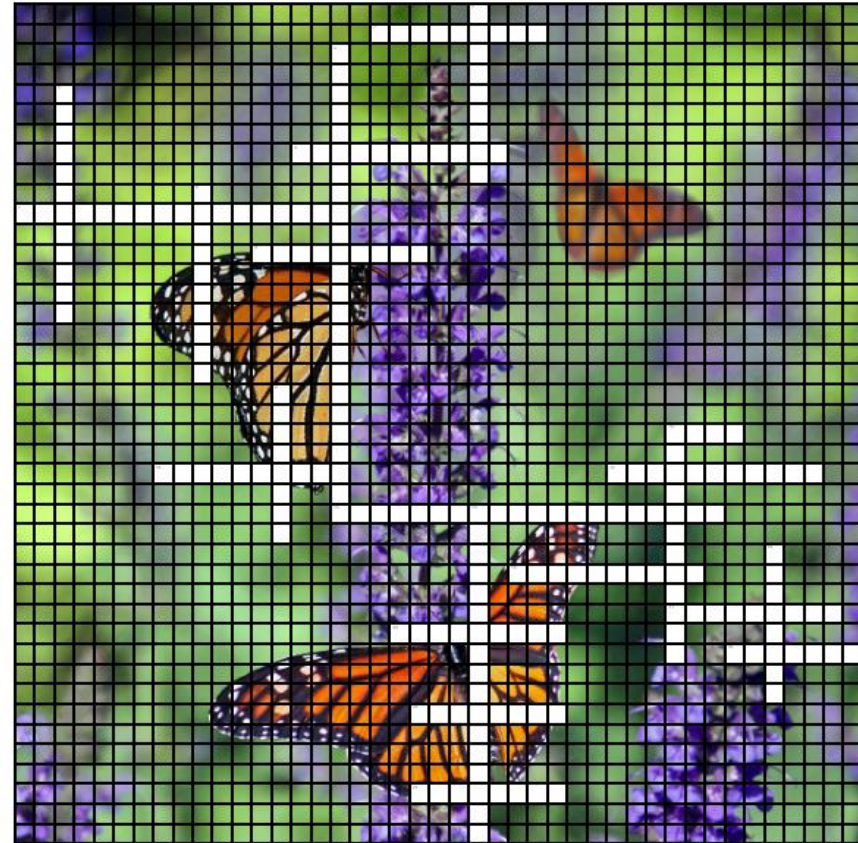
2

★ 0/1

◀ 16 / 26 ▶

# H5P is versatile beyond content presentation.

- Vocab practice (crosswords)
- No-stakes practice (question set)
- Interactive instructions
- Branching scenarios
- Timelines



## Across

2 Relationship between species where there is a close physical association and at least one benefits (9)

5 Ecosystem's ability to produce resources and absorb wastes (11)

7 Potential geographic distribution of a species (11,5)

8 Dispersion pattern where individuals are attracted to each other for varying reasons (9)

10 Organism that interferes with the activities and desires of humans, their possessions, or the environment (4)

11 Group of organisms of the same species that roughly occupy the same geographical area at the same time (10)

12 Life history strategy where organisms of that species have many clutches of progeny over their lifespan (11)



# Taxonomy of Cheetahs



H5P is fairly simple to use, but there are tips to make it even easier.

Generate slides outside of H5P, upload image of each slide, then add interactivity.

Do not use the confusion indicator if you did not create the content.

Share your embed codes!

# But do students like them?

## Other Studies

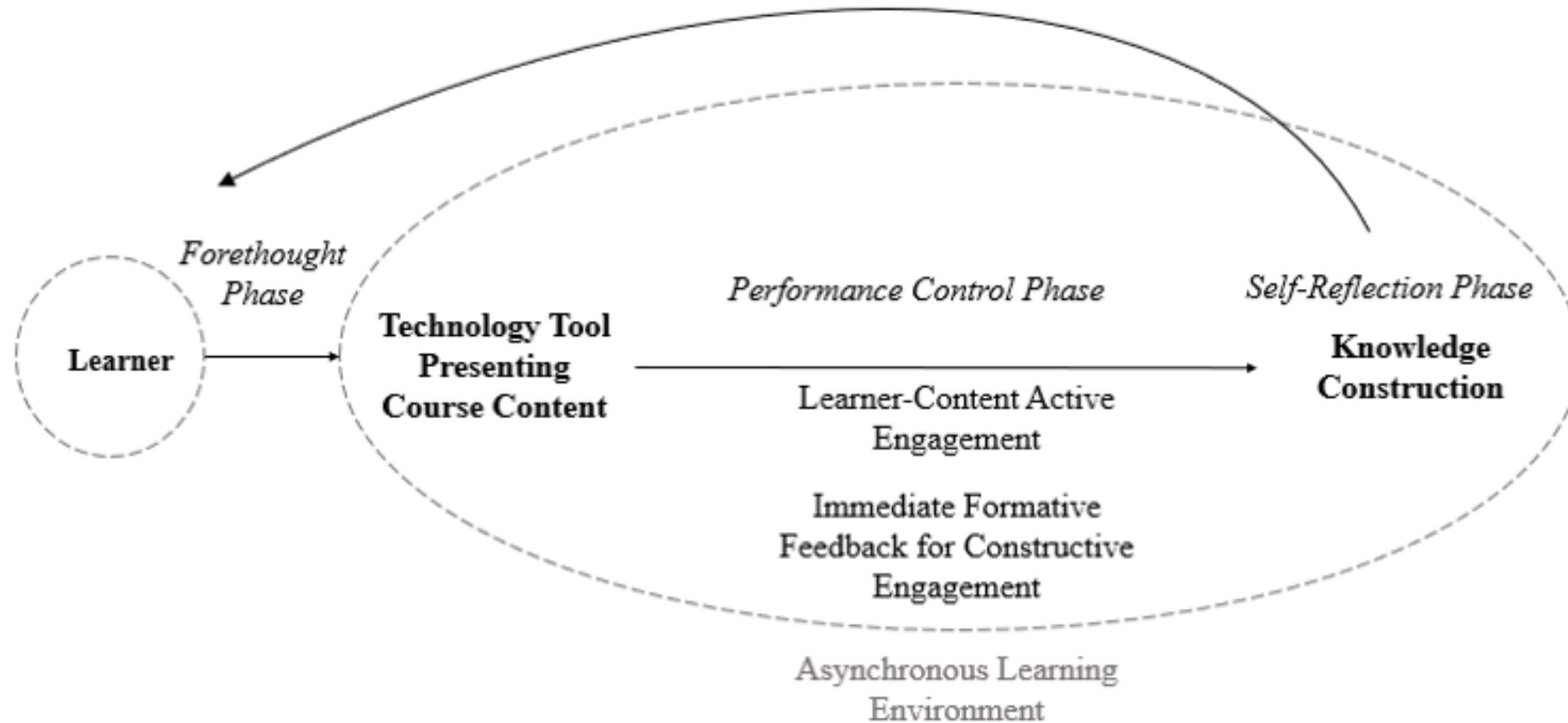
- ✓ 60% consistently use the resources
- ✓ Enhanced knowledge
- ✓ More time than traditional content delivery

## Anecdotal evidence from my classes

How helpful have the following supports I have provided been?



# Engaged learning allows students to refine self-regulated learning.



In STEM, students that demonstrate certain SRL behaviors perform better on summative assessments ([Lawanto et al., 2017](#) and [Jo et al., 2014](#))



# This in-progress study is using the following methods:

## **H5P design**

- Align with course learning outcomes
- Chunked information
- Modified assertion evidence style
- Interactive components and knowledge checks

## **LTI integration with Canvas**

- Drill Down Report
- Embed *ungraded* participation in Canvas

**IRB – Exempt (Approval #22-115)**

# Population, Sample, and Data Collection:

## **General Chemistry 1 (August & October 2022)**

### **Learner Analytics:**

- Canvas data (e.g. Drill Down Reports, course grades)

### **Survey**

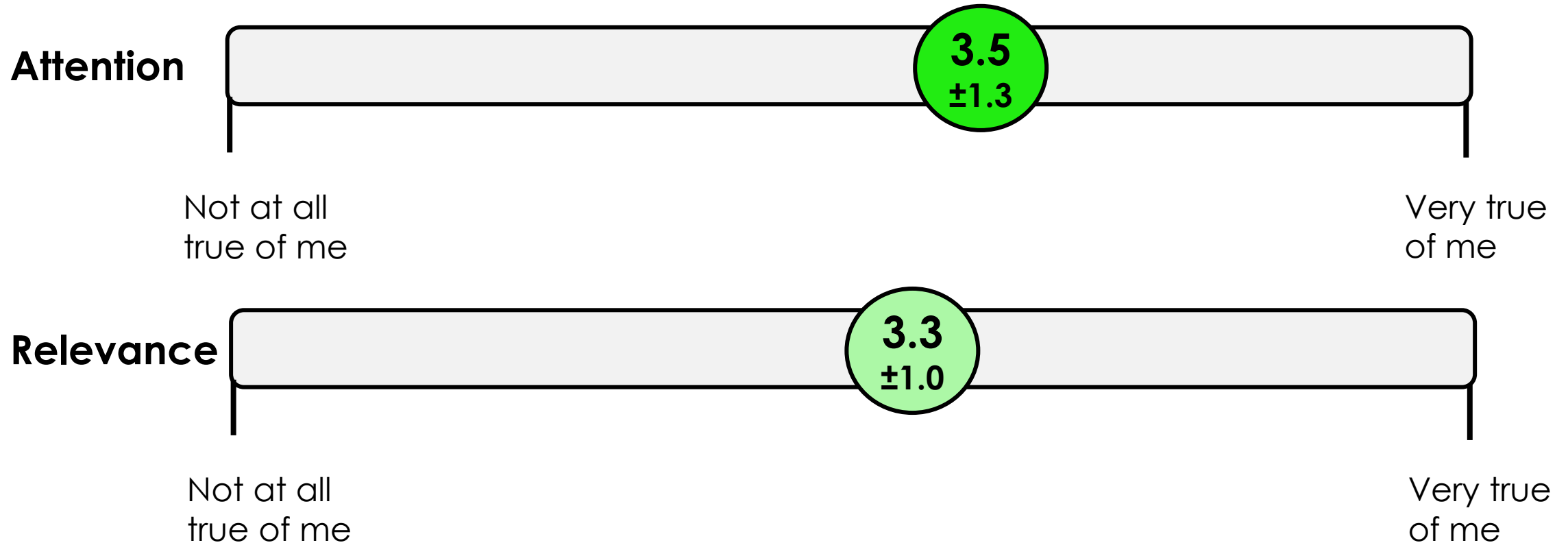
- Self-selection sampling
- One-time survey
- Confidential
- Incentivized (\$5 Amazon e-card)
- Motivation and Self-Regulated Learning Questionnaire (MSLQ)
- Partial use of the Reduced Instructional Materials Motivation Survey (RIMMS)

# I don't have answers to these questions yet ...

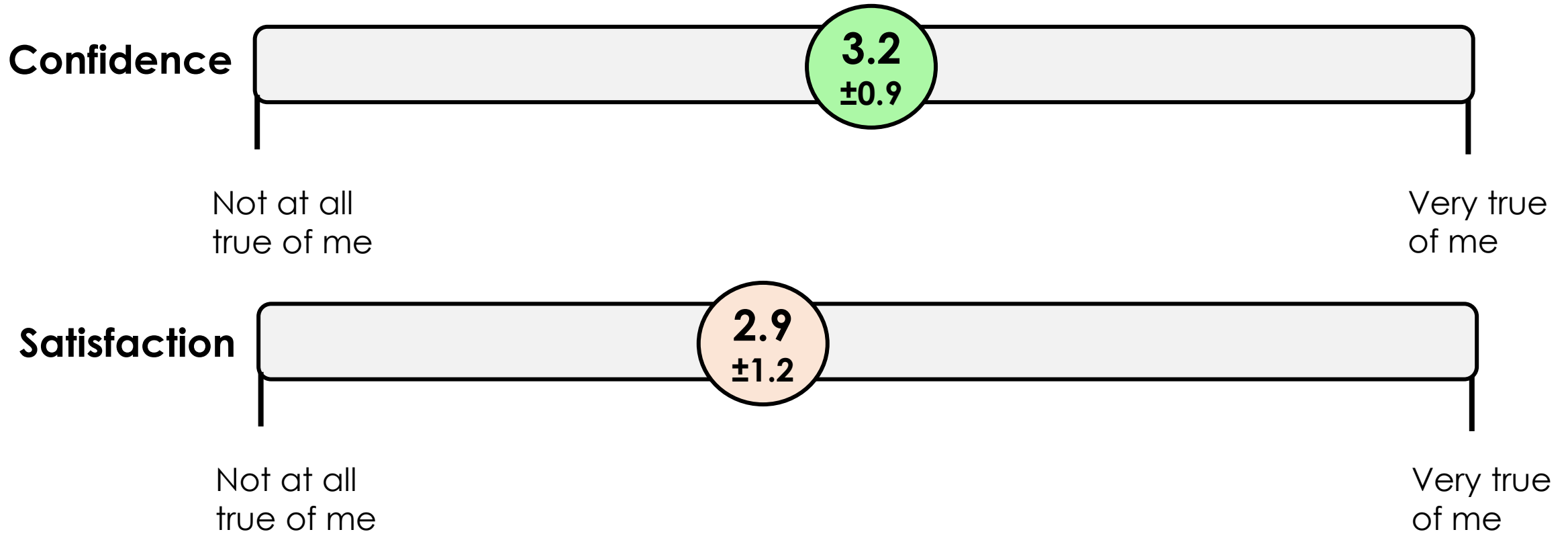
1. Do students have a **positive opinion** of the H5P tool for presenting course content?
2. Do students using H5P resources **demonstrate self-regulated learning behavior(s)**?
3. Does a learner's **perspectives** of their self-regulated learning predict measurable self-regulated learning **behaviors**?
4. How well do learner's self-regulated learning perspectives and behaviors **predict performance**?



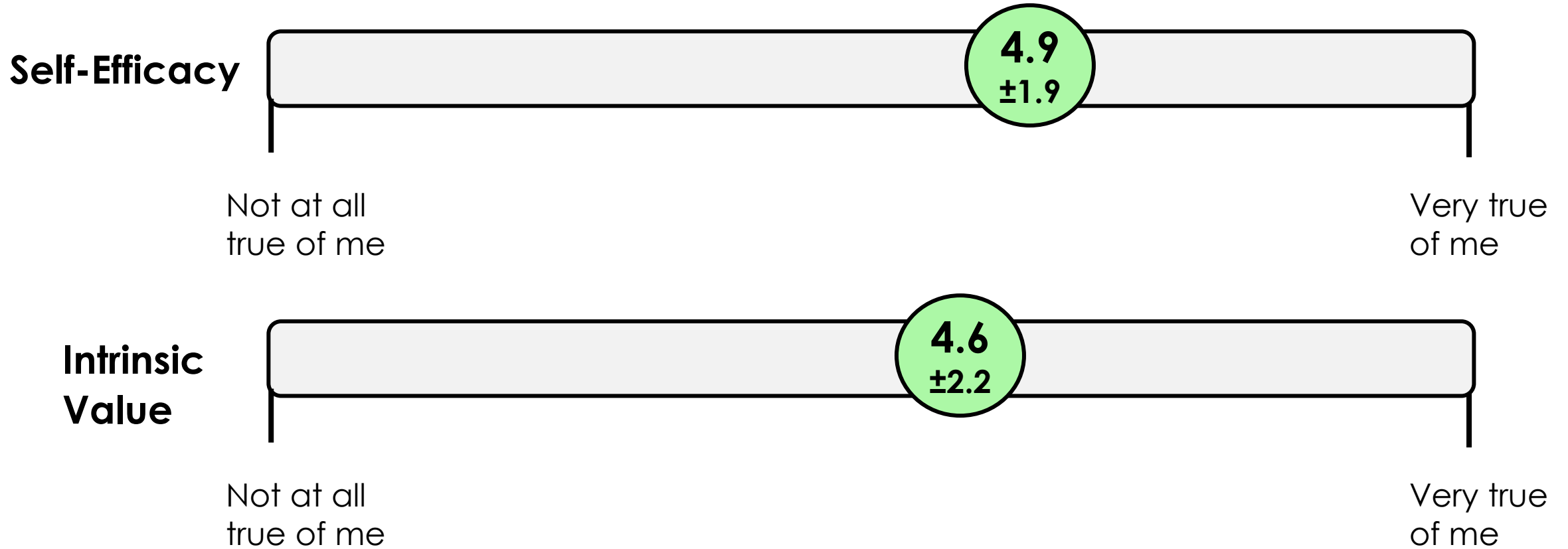
RQ: Do students have a **positive opinion** of the H5P tool for presenting course content? ***n* = 5**



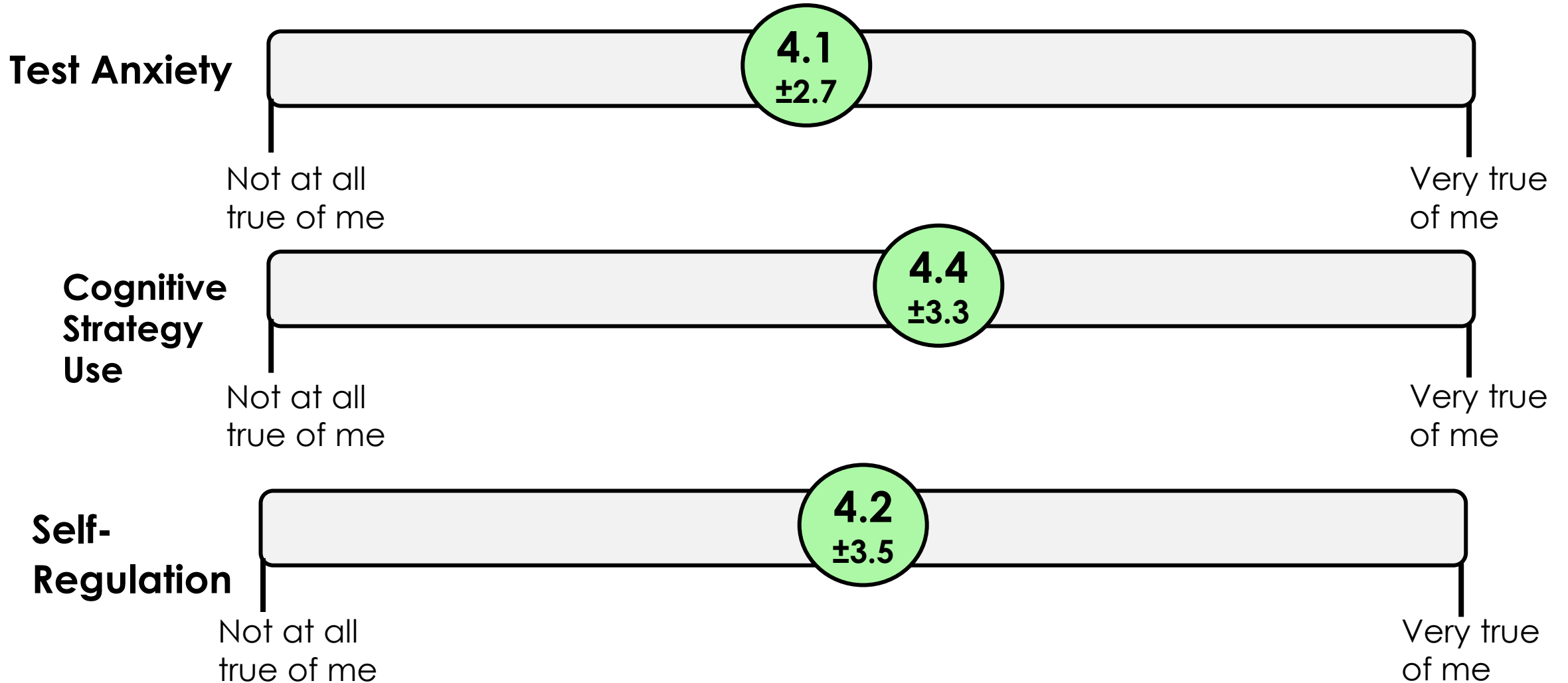
RQ: Do students have a **positive opinion** of the H5P tool for presenting course content? ***n* = 5**



RQ: Do students using H5P resources report strong perceived **self-regulated learning behavior(s)**?



# RQ: Do students using H5P resources report strong perceived **self-regulated learning behavior(s)**?



It is early to explore correlations, but some hypothesized correlations are present in the preliminary data.

↑ Intrinsic Value ↓ Test Anxiety (-0.48)

↑ Self-Regulation ↓ Test Anxiety (-0.28)

All H5P question categories have moderate to strong positive correlations (Attention, Relevance, Confidence, Satisfaction)

***Some interesting trends between MSLQ and RIMMS***

↑ Self-Efficacy ↑ Confidence from H5P Use (0.88)

↑ Self-Efficacy ↑ Satisfaction with H5P (0.76)

↑ Intrinsic Value ↑ Attention, Relevance, Confidence, Satisfaction with H5P  
(0.42) (0.68) (0.61) (0.62)



# RQ: Do students using H5P resources **demonstrate self-regulated learning behavior(s)**?

Very little documented self-reflection behavior (access H5P after 1<sup>st</sup> attempt)



**Let's take the temperature –**  
what are your “warm” and  
“cool” thoughts on H5P  
and its support of active  
and self-regulated  
learning?



<https://www.menti.com/almh48ap828u>



[Live Results](#)

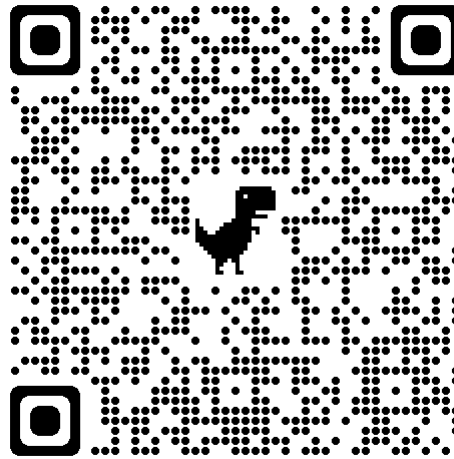


# Thank

# you!



Handout



Session Eval



Google Scholar