GMOs
Scientific Literacy
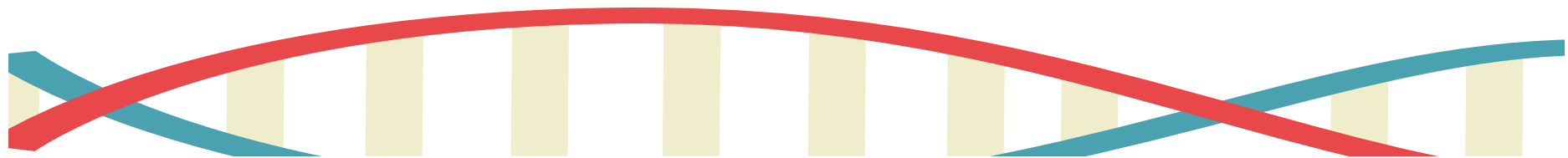
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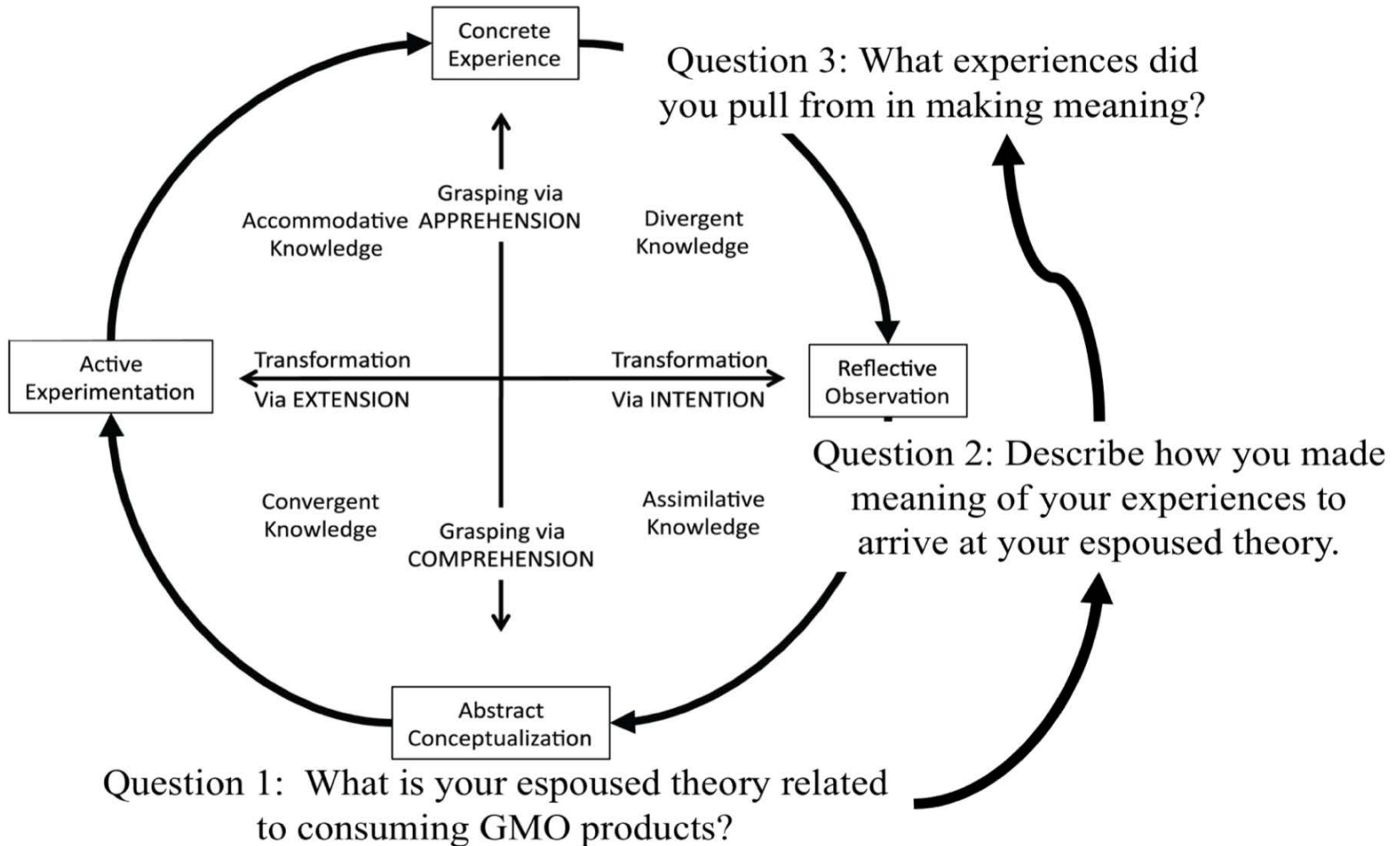
HOW WE THINK
(or don't)

"anchoring, availability cascades, confirmation bias, the Dunning–Kruger effect, the endowment effect, framing effects, group attribution errors, halo effects, ingroup and outgroup homogeneity biases, recency illusions...that's a small selection, but even so: what a list. What a chronicle of ineptitude, arrogance, sheer dumbassery. So much gone wrong, in so many ways, with such devastating consequences for selves and societies. (Jacobs, 2017, p. 12).

Theoretical Approach

Concrete Experience

Question 3: What experiences did you pull from in making meaning?

Grasping via APPREHENSION

Accommodative Knowledge

Divergent Knowledge

Transformation Via EXTENSION

Transformation Via INTENTION

Active Experimentation

Reflective Observation

Question 2: Describe how you made meaning of your experiences to arrive at your espoused theory.

Convergent Knowledge

Assimilative Knowledge

Grasping via COMPREHENSION

Abstract Conceptualization

Question 1: What is your espoused theory related to consuming GMO products?

METHODS

GMOs – STEM in Agriculture Video Rubric   Participant ID #_____

Participant can/will	Participant's Answer	Researchers Comments / Notes on Participants Abstractions
Opinion 1: Eat a GMO	Yes_____ No_____ Indifferent_____	Why?
Concept 1A: Define a GMO Blooms Level 1 - Knowledge	Yes_____ No_____	G – M – O –
Concept 1B: Explain GMOs Blooms Level 2 - Understanding	Yes_____ w/Prompting_____ No_____	Description -
Concept 1C: Apply GMOs to Agriculture Blooms Level 3 - Applying	Yes_____ w/Prompting_____ No_____	How?
Concept 2A: Define DNA (Double Helix Structure) Blooms Level 1 - Knowledge	Yes_____ w/Prompting_____ No_____	
Concept 2B: Explain a double helix/DNA Blooms Level 2 - Understanding	Yes_____ w/Prompting_____ No_____	
Concept 2C: Apply a Double Helix to Genetic Modification Blooms Level 3 - Applying	Yes_____ w/Prompting_____ No_____	
Concept 3A: Names Protein Production Blooms Level 1 - Knowledge	Yes_____ w/Prompting_____ No_____	
Concept 3B: Relates Protein Production to Genetic Modification Blooms Level 2 - Understanding	Yes_____ w/Prompting_____ No_____	
Concept 3C: Constructs a model demonstrating protein production in GMOs Blooms Level 3 - Applying	Yes_____ w/Prompting_____ No_____	

Revised Blooms Taxonomy Key
Level 1 – Knowledge – Recall facts and basic concepts
Level 2 – Understanding – Explain ideas or concepts
Level 3 – Applying – Apply knowledge to new situations (Agronomic connections)

VT_____   FT_____   NT_____

VT = Valid Theory
FT = Flawed Theory
NT = No Theory

2 **Did students hold valid theories to back their intent to consume GMOs?**
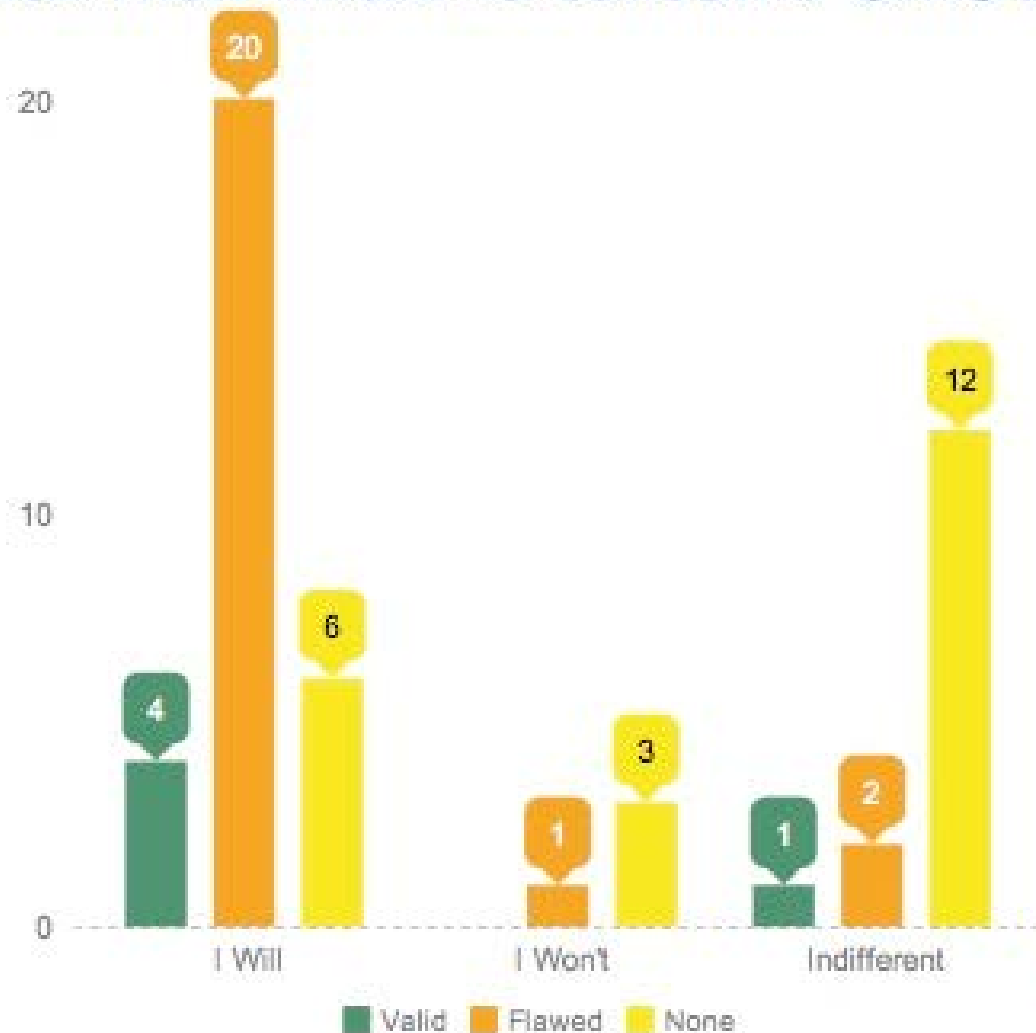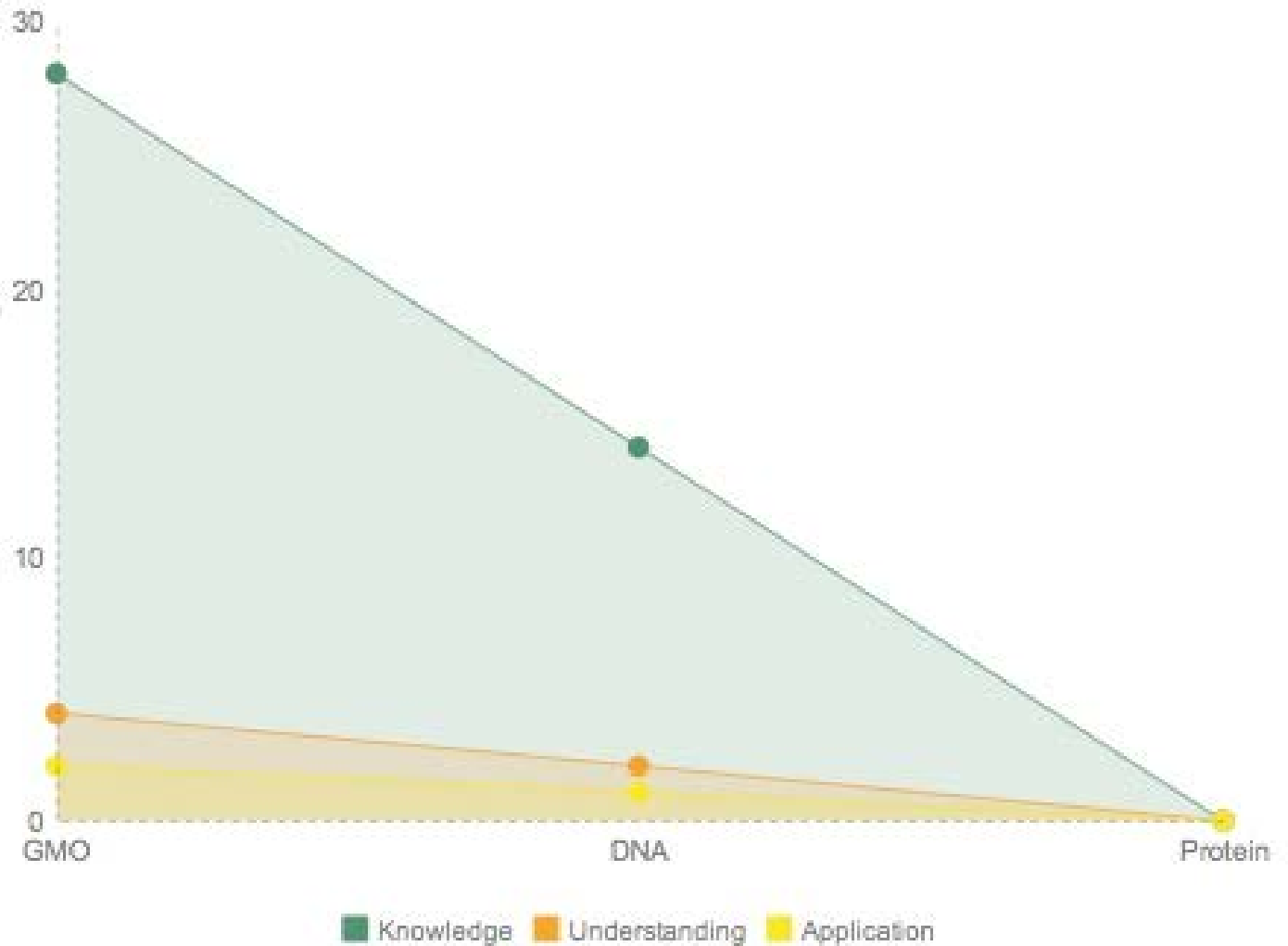
3 Could students connect science concepts to GMO practices?

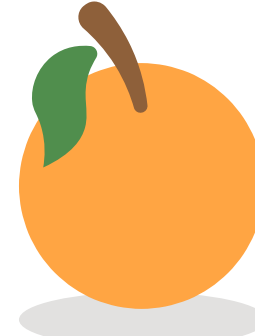Knowledge ■ Understanding ■ Application
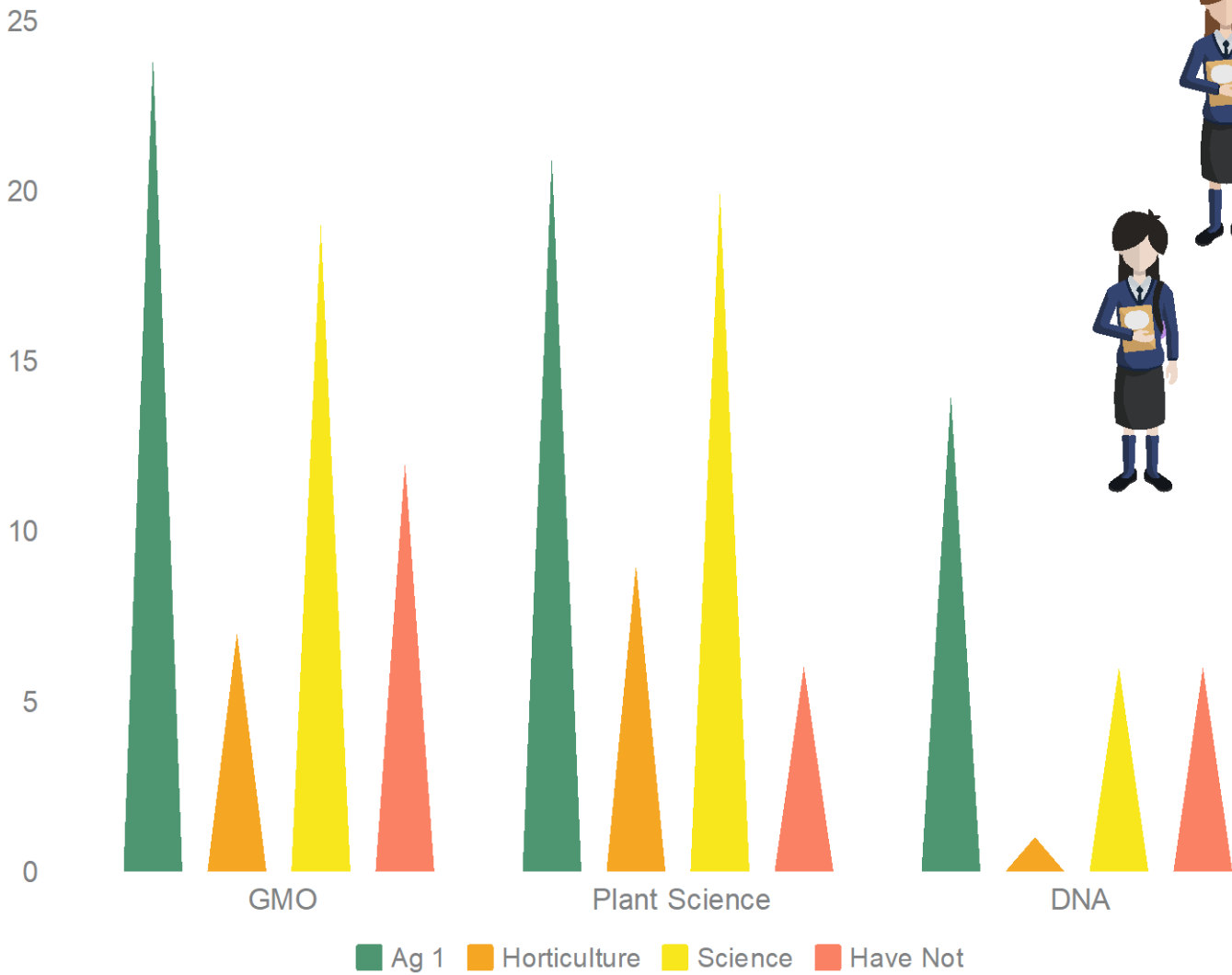
CONCLUSIONS

- The majority of students expressed they would consume GMO products, but had an invalid, or no theory to support that decision.

- Students had very limited knowledge in both the agriculture and science of GMO.

- Students were unable to demonstrate understanding or application of key concepts related to DNA and protein synthesis.
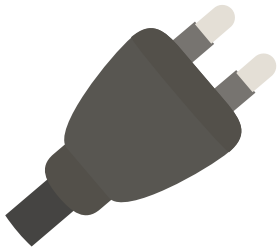
IMPLICATIONS

- Don't assume students have an understanding of basic science concepts and the application to agriculture.

- Push students to transfer scientific principles to an agricultural context.

- Kolb (2014), "If the education process begins by bringing out the learner's beliefs and theories, examining and testing them, and then integrating the new, more refined ideas into the person's belief systems, the learning process will be facilitated" (p. 39).

Thank you.

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