The Defining Features Matrix as a Review Strategy for Psychopharmacology Concepts

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Abstract

Review sessions during undergraduate biology courses often involve revisiting material covered during several hour-long lectures. Depending on the course content, one has to often choose between going over most of the material superficially or emphasizing and discussing selected, key topics. In addition, it can be challenging to make the session interactive, especially with large class sizes.

As a Teaching-as-Research (TAR) Fellow, I aimed to identify and employ a strategy during a mid-course review session held before an exam that would be fast-paced, comprehensive, not 'teaching to the test', and involving student engagement. A secondary aim was to assess its effectiveness in enhancing student engagement and exam performance. Here I describe the use of a Defining Features Matrix for reviewing basic concepts of Psychopharmacology (Pharmacokinetics and Pharmacodynamics), discuss the method of its implementation in a class of over 50 students, highlight some observations and potential implications.

Background

Description of the Course

Course	AS.200.376. Psychopharmacology
Instructors	H. Adwanikar; S. Sterbing-d'angelo
TAR Fellow	A. Shah
Major	Neuroscience or Behavioral Biology
Credits	3.0
Eligibility	Juniors and Seniors
Class Limit	75

Mid-Course Review Session Format Before Intervention

✓ Revisiting slides ('Highlights')
✓ Case studies ('Is there a Doctor In the House?')

Objectives

Identify a *fast-paced* and *engaging* activity for a review session that covers basic concepts in Psychopharmacology.

Learning Outcomes

Define the terms *Pharmacodynamics* and *Pharmacokinetics*

Compare and contrast *Pharmacodynamics* and *Pharmacokinetics*

Categorize case studies as examples of *Pharmacodynamics* or *Pharmacokinetics*

Execute the activity.

Assess its impact on
▹ student participation
▹ self-assessment of their learning and confidence
▹ exam performance

Approach

Defining Features Matrix

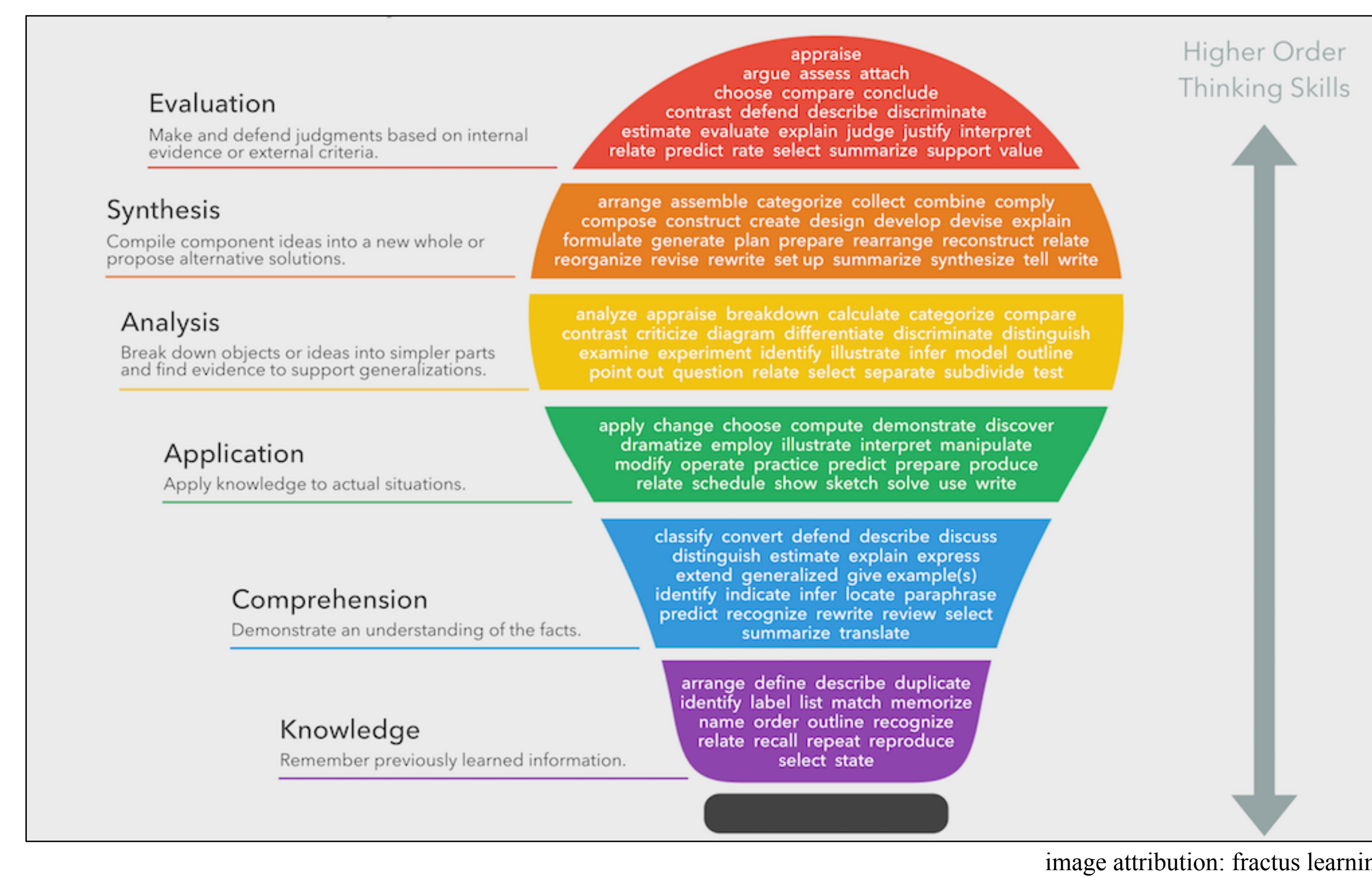| Defining Feature	Pharmacokinetics (A)	Pharmacodynamics (B)
Feature 1	✓	
Feature 2		✓
Feature 3	✓	

A Defining Features Matrix consists of three columns. Two distinct concepts that have potentially confusing similarities form the titles for Columns 2 and 3. Features related to these concepts are described in Column 1.
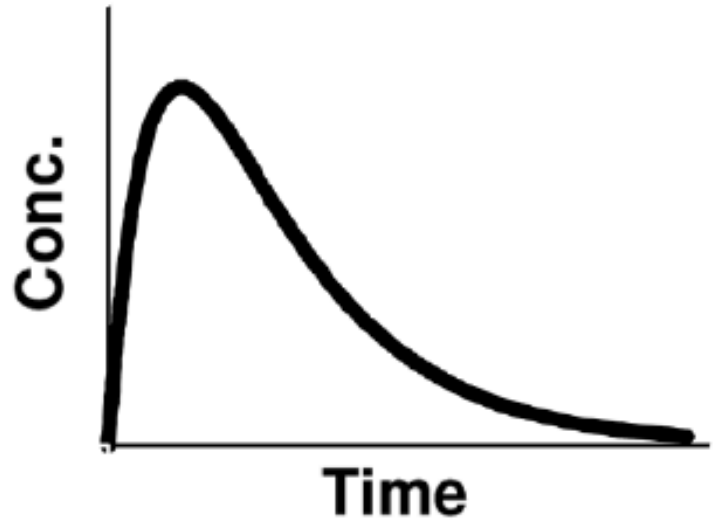
During the mid-course review session, one feature was revealed at a time on a PowerPoint slide.

The feature was read out loud and students were given 20 seconds to select either A for *Pharmacokinetics* or B for *Pharmacodynamics* using their Clickers.

As soon as the time allotted to respond was up, responses were displayed as bar graphs on the screen and the correct answer revealed.

Features in the matrix included:
▹ Definitions
▹ Related Concepts
▹ Graphs and Figures
▹ Case Studies

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Defining Feature	Pharmacokinetics (A)	Pharmacodynamics (B)
What the body does to the drug	✓	
What the drug does to the body		✓
A drug's **potency** is determined by		✓
A drug's **bioavailability** is determined by	✓	
A drug's **Therapeutic Index** is determined by		✓
The **half-life** of a drug is determined by	✓	
		✓
Drug tolerance is a consequence of		✓
Drug specificity is determined by		✓
During a job interview, Mr. Ile B Fine had to submit a urine specimen for drug testing. He occasionally smoked marijuana. The results of his drug test will be affected by the drug's..	✓	

Observations

Students interacted with their neighbors to discuss their perspectives before and after the answers were revealed, although they weren't explicitly instructed to do so.

The number of incorrect responses for 'Features' (concepts or applications) that were discussed during previous class sessions was informative.

Advantages of Using the Defining Features Matrix as a Review Strategy

The content of the activity covered two introductory sessions extensively. These topics formed the bulk of the content that the upcoming exam focused on.

The activity took up 15 minutes of a 75-minute class session.

It involved active participation from the entire class.

The use of Clickers enabled real-time assessment.

Responses displayed on the screen were anonymous. However, pre-registered Clickers would allow tracking of individual responses.

Future Directions

Conduct a survey to determine if the activity helped students:
▹ Understand the concepts better
▹ Identify their strengths and weaknesses
▹ Feel more confident
▹ Get motivated to revisit their notes / Improve their study habits

Compare exam scores - specifically for questions based on these concepts - from this year with those for a previous year to assess the impact of the activity on students' performance.

Extending the Use of the Defining Features Matrix as a Review Strategy

Provide time to Think-Pair-Share and re-attempt the question, before correct answers are revealed.

Explain the rationale underlying every answer.

Post the explanations on Blackboard.

Follow up with individuals who consistently performed poorly during the activity.

References

Angelo, T.A., and Cross, K.P., 1993, Classroom Assessment Techniques: A Handbook for College Teachers, 2nd edition, Josey Bass.

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Acknowledgements