#### FABLE: A Critical Thought Tutor

Fallacy Awareness and Bias Learning Environment

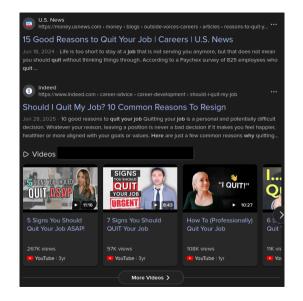
Landon Taylor

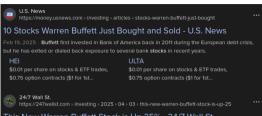
16 April 2025

We need to talk about critical thinking.

People make huge decisions based on flawed reasoning.

## **Confirmation Bias** Should I quit my job?





This New Warren Buffett Stock is Up 25% - 24/7 Wall St.
7 days ago - Warren Buffett and Berkshire Hathaway (NYSEBRK-B) have been quite notable sellers of stocks in recent quarters. With the stock market correcting for Spring and the potential for things to worsen ...



Is Warren Buffett Buying Stocks Right Now? Here's What He Jus...

Mar 29, 2025 · When Warren Buffett is picking stocks, he says he's more focused on buying excellent businesses at fair prices than he is on getting bargains. Although stock prices have dropped in 2025 ...

# **Appeal to Authority** What stocks to buy?

**Appeal to Emotion** Pet Adoption



D : 1:11	
Precious kittens are at risk.	
The stakes are too high.	

Surely public schools are teaching critical thinking skills, right?

## **WRONG!**

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Well, mostly wrong.

Teaching approaches tend to focus on subject content rather than [Critical Thinking] development.<sup>1</sup>

<sup>&</sup>lt;sup>1</sup>Nada J. Alsaleh. "Teaching Critical Thinking Skills: Literature Review". In: *Turkish Online Journal of Educational Technology - TOJET* 19.1 (Jan. 2020), pp. 21–39. URL: https://eric.ed.gov/?id=EJ1239945 (visited on 04/10/2025).

# There's got to be a decent ITS to teach critical thinking skills!

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It's mostly just textbooks and Quizlet, and some *formal* reasoning tutors.

What's the problem with textbooks and Quizlet?

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What's the problem with textbooks and Quizlet?

They are boring as hell.

Students don't engage.

I looked to them for inspiration for my project and I fell asleep at my desk.

You know what isn't boring?

You know what isn't boring?	
Stories about saving our galaxy from evil space aliens.	

#### Introducing: FABLE.

**F**allacy Awareness and

**B**ias

Learning **Environment**  Please select or create a user profile.

? Your response: 
> Tasouva
> Tasouva
Yoctret
Create New
[11 to move, enter to select, type to filter]

#### Progress Report for Tasouva:

Unit	Mastery
00% Introduction	
00% Logic: Logical Operations	[
00% Logic: Boolean Algebra	[
00% Fallacy: Formal: Propositional Fallacy	[
00% Fallacý: Formal: Probabilistic Fallacý	
33% Fallacy: Formal: Syllogistic Fallacy	
67% Fallacy: Formal: Quantificational Fallacy	
67% Fallacy: Informal: Post Hoc Ergo Propter Hoc	
67% Fallacy: Formal: Quantificational Fallacy 7% Fallacy: Informal: Post Hoc Ergo Propter Hoc 67% Fallacy: Informal: Slippery Slope	
67% Fallacy: Informal: Texas Sharpshooter	
67% Fallacy: Informal: Hasty Generalization 67% Fallacy: Informal: Over Generalization	
67% Fallacy: Informal: Over Generalization	
50% Fallacy: Informal: No True Scotsman 67% Fallacy: Informal: Quoting Out Of Context	
67% Fallacy: Informal: Quoting Out Of Context	
50% Fallacy: Informal: Ad Hominem	
67% Fallacy: Informal: Tu Quoque	
50% Fallacý: Informal: Bandwagon	
67% Fallacy: Informal: Straw Man	
67% Fallacy: Informal: Straw Man 90% Fallacy: Informal: Ad Ignorantiam 50% Fallacy: Informal: Special Pleading	
50% Fallacy: Informal: Special Pleading	
50% Fallacy: Informal: Begging The Question	
33% Blas: Confirmation Blas	
67% Bias: The Halo Effect	
33% Blas: Fundamental Attribution Error	
67% Blas: In Group Blas	
33% Bias Dunning Kruger Effect	
67% Bias: Barnum Effect	
75% Appraisal: Conversion to Propositional 67% Appraisal: Counter Argument	
6/8 Appraisa: Counter Argument	

#### Welcome to the Galactic Academy

Greetings, Cadet! Welcome to the Galactic Academy. As you know, our galaxy is in grave danger. We need braye souls like you to help us navigate the cosmos and communicate with alien species. Your training begins now!

We have been stuck in space for a long time, and we need to learn how to communicate with aliens.

You see, they are capable of extremely precise logical thinking, and we need intergalactic diplomats who can reason with them. This is where you come in!.

#### Two-Loop Model

FABLE follows a 2-loop model. The outer loop selects "units" (i.e., single fallacies, biases, or techniques), and the inner loop guides a student through lesson content, including reading (1 paragraph at a time) and quiz questions.

Greetings, human! What is the answer to the ultimate question of life, the universe, and everything?

(You can get a hint if you need it)

Your response: To boldly go where no one has gone before To explore the mysteries of the universe Get hint

### Scaffolding

- Levels of hints to support learners
  - Re-phrase something in the question
  - Remind of previous knowledge
  - 3 Bottom-out with the answer, re-attempt the unit later
- Question types increase in complexity during learning
  - Multiple-Choice Questions
  - Multi-Select Questions
  - 3 Free Response (one-word answers)

How many fingers does the 9-Fingered Space Badger have?

Please try the question again. Here's a hint: Its name is the 9-Fingered Space Badger.

Press enter to continue

#### AI Techniques

- GPT generates a template for course content (text, quizzes, etc.)
  - Human verifies correctness of generated content
  - AI reduces the burden of course creation.
- During learning, simple Bayesian Knowledge Tracing tracks progress
  - Students keep trying until they consistently answer questions correctly

#### Affective Support

- Learning Critical Thinking skills can be boring
  - Excessive theming provides small "brain breaks" to avoid fatigue
  - Interesting and realistic questions keep student attention
  - Short description followed by a quiz-based learning approach keeps students actively engaged.

The president of Planet Zog has to keep her population safe and happy. She has a lot of decisions to make, and she needs to use logical operations to help her. For example, if the weather is nice AND the streets are clean, people can go to work. If the weather is NOT nice OR the streets are covered in slime, everyone should stay home.

"It's so dorky, I lowkey love it."

"It's so dorky, I lowkey love it."
— My Wife

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Out of 1 student, 100% reported positive learning outcomes.

#### **Future Work**

- Integrate SAT solving to automatically generate logically sound/fallacious text
- Deeper integration with the story component (i.e. use GPT for story and theme only)
- Development of an online GUI (for accessibility)

#### In Conclusion

- Learning Critical Thinking skills need not be boring
- FABLE uses AI techniques to help students learn and keep them engaged