



**Avoid falling for Bullshit.**

**Statistical Bullshit, the new norm.**

**Develop Critical Thinking &  
Data Science Skills.**

# Stiftung für kritisches Denken: Critical Thinking

## Die Definition:

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- kommuniziert gut, um Lösungen für komplexe Probleme zu ermöglichen.

# Developing First Year Students' Critical Thinking Skills

Theda Thomas

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Received: February 2, 2011    Accepted: February 23, 2011    doi:10.5539/ass.v7n4p26

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**Keywords:** Critical thinking, First year pedagogy, Generic skills, Graduate attributes

# Video: Critical Thinking: Why, How Examples, 2020

## Critical Thinking in the Classroom

### Introduction

Education



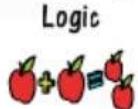
Multiple Uses



Beliefs



Deduction  
Reasoning



Logic

Analyze Information and make reasonable judgements

### Instruction

Educators should foster critical thinking in students



Intellectual  
Skepticism



Bloom's  
Taxonomy



Assessment  
Incorporation



Argument  
Analysis

### Definition

Evaluate Rational Skill Self-Regulatory



Critical Thinking has been defined in many ways

### Development

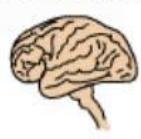
Student can develop critical thinking in several ways



Follow Evidence



Be Inquisitive



Metacognition

### Examples

Class  
Debates



Think Pair Share

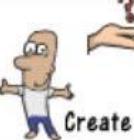


Inventions

Riddles



Gap Fill-in



Create Cartoons

### Forms

Verbal  
Reasoning



Probabilistic Reasoning

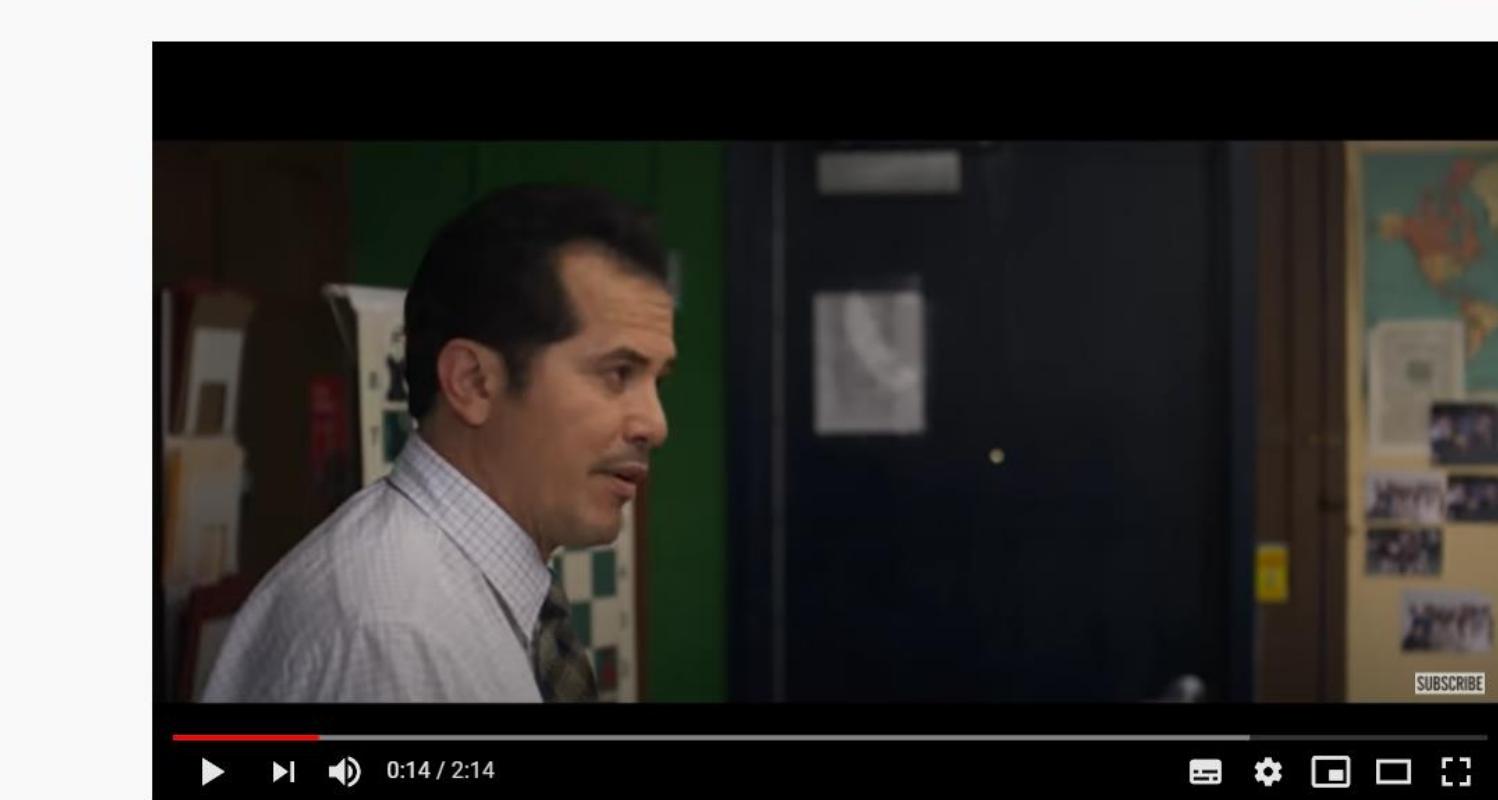


Scientific  
Reasoning



Critical thinking may take on three different forms

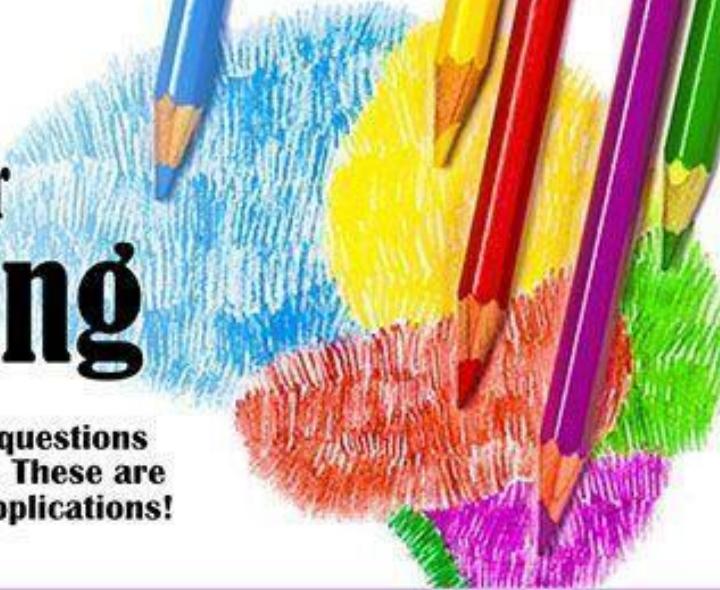
# Movie “Critical Thinking” – Coming Soon



A screenshot of a YouTube video player showing a scene from the movie "Critical Thinking". The video frame shows a man with short dark hair and a mustache, wearing a light-colored button-down shirt, looking off to the side with a serious expression. He is standing in what appears to be a classroom or office setting, with bulletin boards and children's artwork visible in the background. The YouTube interface includes a navigation bar at the top with back, forward, and refresh icons, a URL bar showing "youtube.com/watch?v=A6QT76ISJVU", and various user interface elements like a search bar, a 'Suchen' button, and a 'SUBSCRIBE' button in the bottom right corner of the video frame. Below the video frame is a control bar with a play button, volume controls, and a timestamp of "0:14 / 2:14". At the bottom of the screen, the title "Critical Thinking Trailer #1 (2020) | Movieclips Trailers" is displayed, along with the number of views "189.498 Aufrufe • 05.08.2020" and interaction metrics: "3439", "140", "TEILEN", and "SPEICHERN".

# The Ultimate Cheatsheet for Critical Thinking

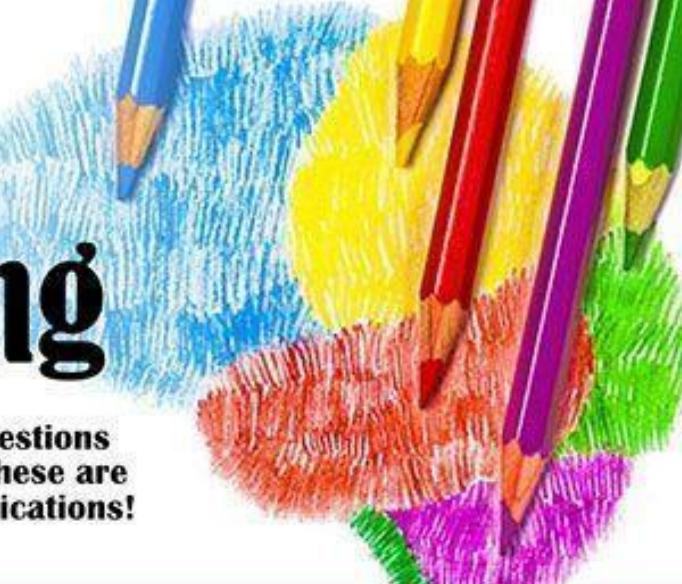
Want to exercise critical thinking skills? Ask these questions whenever you discover or discuss new information. These are broad and versatile questions that have limitless applications!



Who	<ul style="list-style-type: none"><li>... benefits from this?</li><li>... is this harmful to?</li><li>... makes decisions about this?</li><li>... is most directly affected?</li><li>... have you also heard discuss this?</li><li>... would be the best person to consult?</li><li>... will be the key people in this?</li><li>... deserves recognition for this?</li></ul>
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We are drowning in Bullshit.

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Avoid falling for Bullshit.

Society needs Critical Thinking & Data Science Skills more than ever.

# **Critical Thinking!**

## **Think Better. Be Better. Become a Champion.**



# OECD, Wikipedia: 21<sup>st</sup> Century Skills

## 21st Century Skills

How today's students can stay competitive  
in a changing job market

### Learning Skills



critical thinking



creativity



collaboration



communication

### Literacy Skills



information



media



technology

### Life Skills



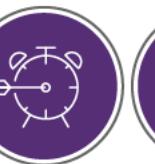
flexibility



leadership



initiative



productivity



social skills

## 21st century skills

From Wikipedia, the free encyclopedia

**21st century skills** comprise **skills**, **abilities**, and learning **dispositions** that have been identified as being required for success in 21st century society and workplaces by educators, business leaders, **academics**, and **governmental agencies**. This is part of a growing international movement focusing on the skills required for students to master in preparation for success in a rapidly changing, **digital society**. Many of these skills are also associated with **deeper learning**, which is based on mastering skills such as **analytic reasoning**, **complex problem solving**, and **teamwork**. These skills differ from traditional academic skills in that they are not primarily content knowledge-based.<sup>[1][2][3]</sup>

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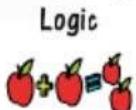
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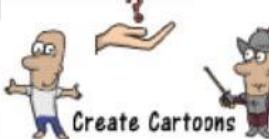


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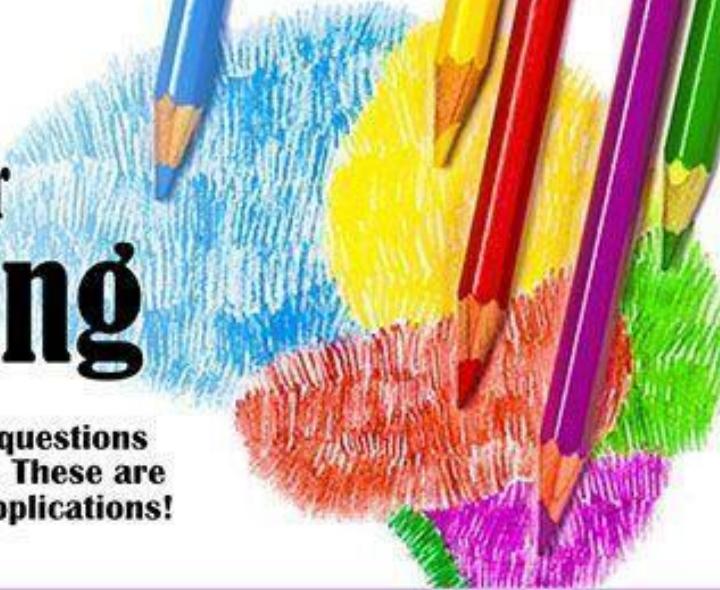
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## **What about Opinions & Beliefs?**



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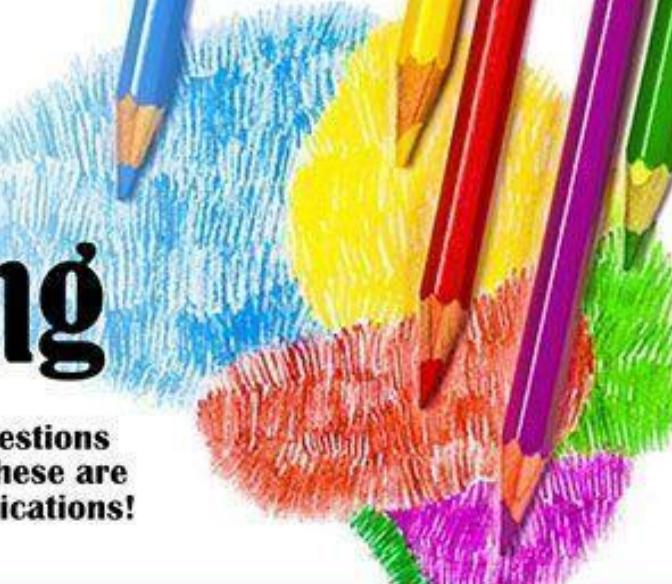
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# 1 Bullshit with Data

## - The Art of Skepticism in a Data-Driven World

### (1) Motivation



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# 1 Bullshit with Data

## - The Art of Skepticism in a Data-Driven World

### (3) Basics of Bullshit



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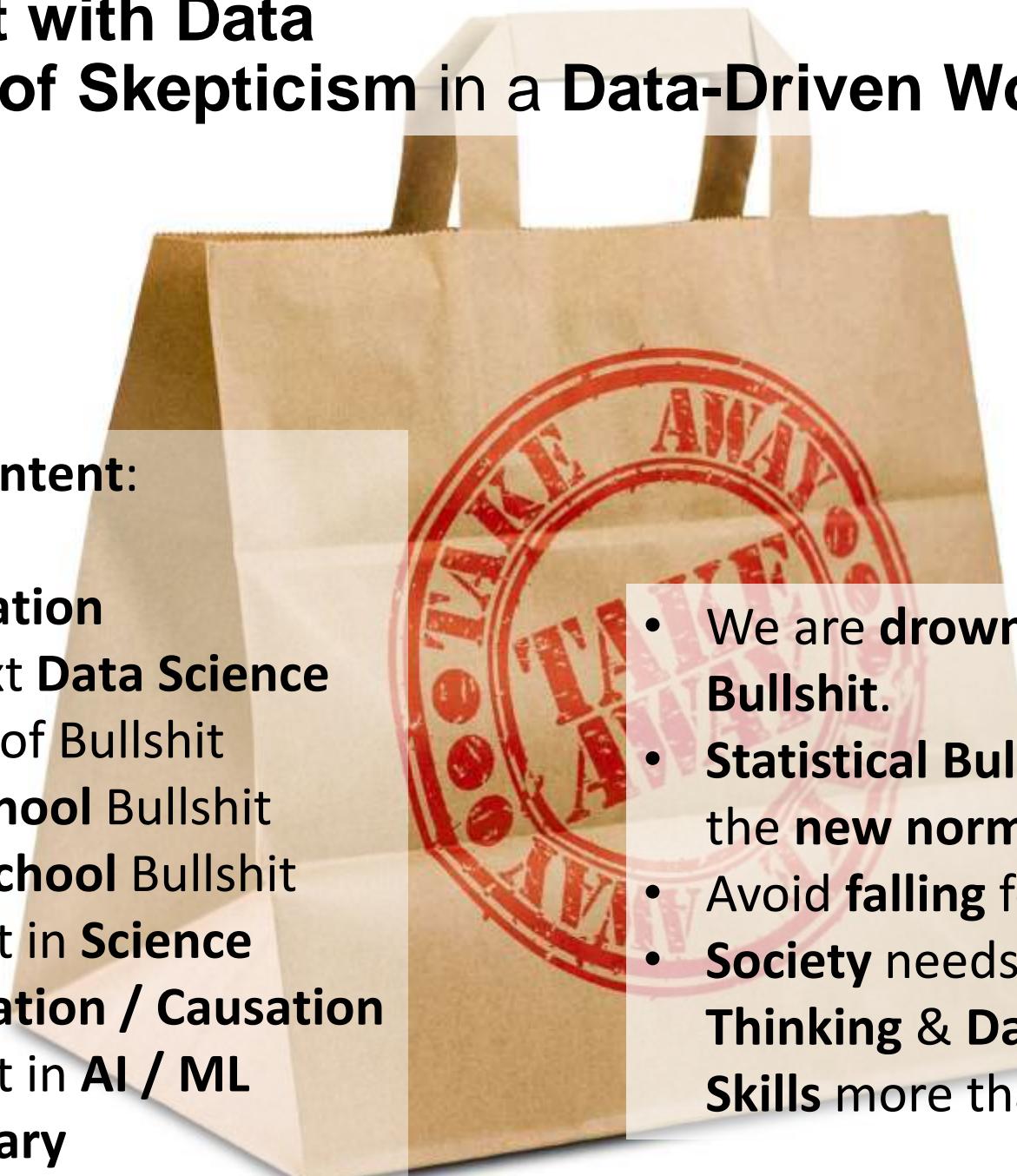
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- 2. Context Data Science**
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- 6. Bullshit in Science**
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- 8. Bullshit in AI / ML**
- 9. Summary**

- We are **drowning** in **Bullshit**.
- **Statistical Bullshit** is the **new norm**.
- Avoid **falling** for **Bullshit**.
- Society needs **Critical Thinking & Data Science Skills** more than ever.



# According to OECD, what is Not an 21<sup>st</sup> Century Learning Skill?



Art des Wissens	Naturwissen	Anwendungswissen (Literatur)
Schwerpunktgrad	Kognitiv	
Einfach		
Mittel		
Schwert		

- a) Communication
- b) Curiosity
- c) Creativity
- d) Critical Thinking
- e) Collaboration