Addition by Subtraction:

Reducing Overload to Optimize Learning for the Knowledge Economy

Kassandra Robertson

Overview

Who are Gen Z?

- Characteristics & Perceptions
- Challenges & Opportunities

Cognitive Load Theory (CLT) in Education

- Processing Capacity in Learning
- Mental Health Considerations

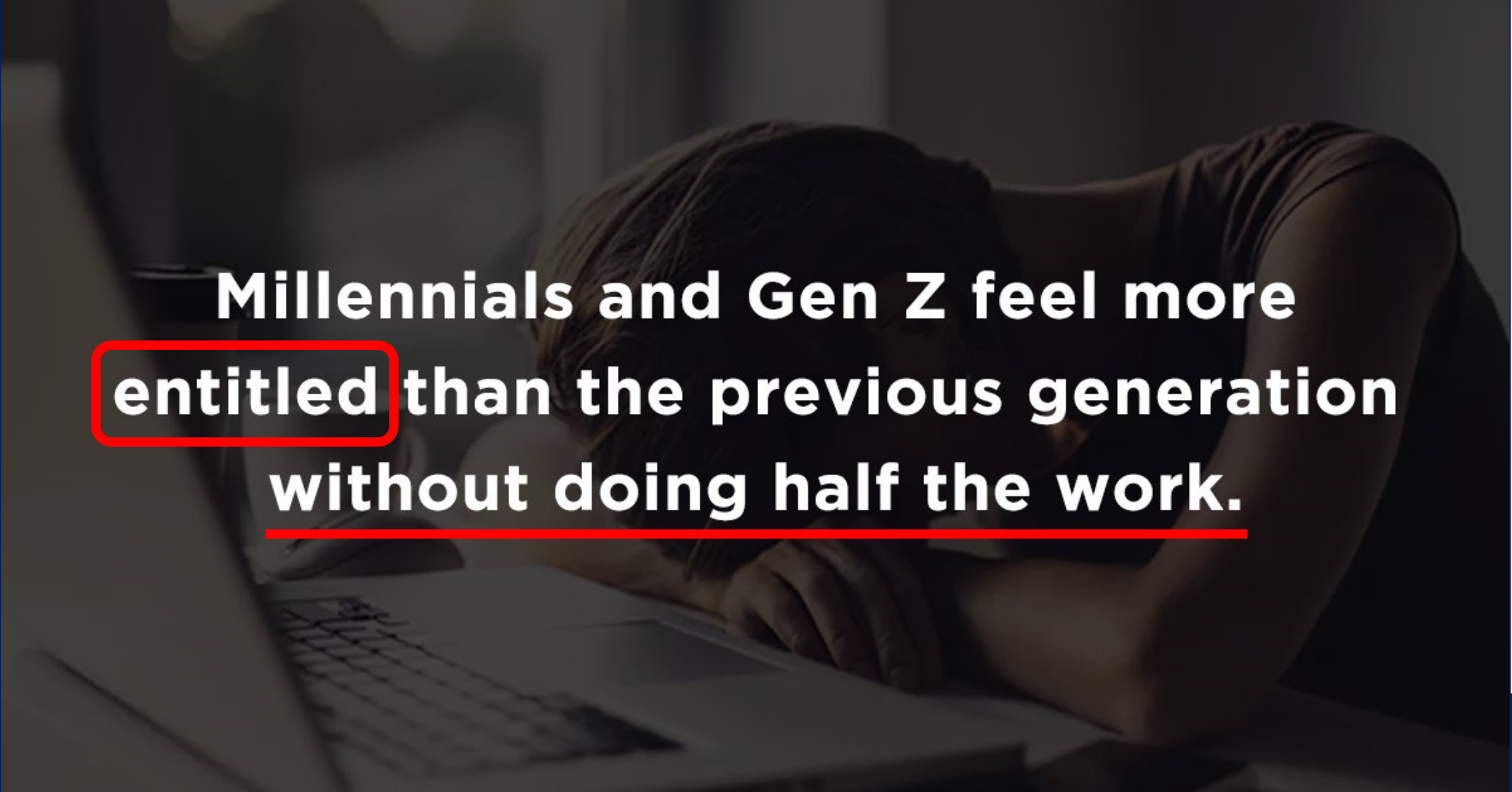## Optimizing Learning for the Knowledge Economy

- Reimagining Curricula Objectives
- Managing the Input Stream: Principles from Design
- Constructive Applications of Generative AI for EAP

Defining Characteristics

| Baby Boomers	Generation X	Millennials	Generation Z
1946–1964	1965–1980	1981–2000	2001–2020
Workaholic | Team-oriented	*Skeptical | Independent*	*Competitive | Open-Minded*	*Distracted | Entrepreneurial*
Vietnam War, Civil Rights Movement, Watergate	Fall of the Berlin Wall, **dot-com boom**	Columbine, 9/11, **the Internet**	**Great Recession, access to tech from a young age**
Company loyalty, teamwork, duty	Diversity, **work-life balance**	Quality of their manager, **unique work experiences**	**Diversity, individuality,** creativity
Whatever is most efficient, including *phone calls* & *face-to-face*		DMs, texts, and *email*	DMs, texts, and *social media*

Who are Gen Z?

Millennials and Gen Z feel more entitled than the previous generation without doing half the work.
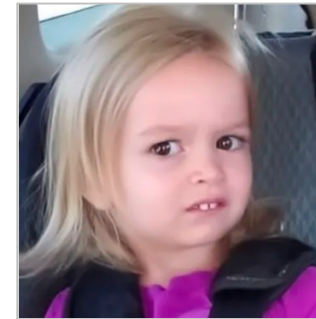
NO I CAN'T DO SNAPCHAT OR TIKTOK BUT I CAN WRITE IN CURSIVE, DO MATH WITHOUT A CALCULATOR AND TELL TIME ON A CLOCK WITH HANDS.
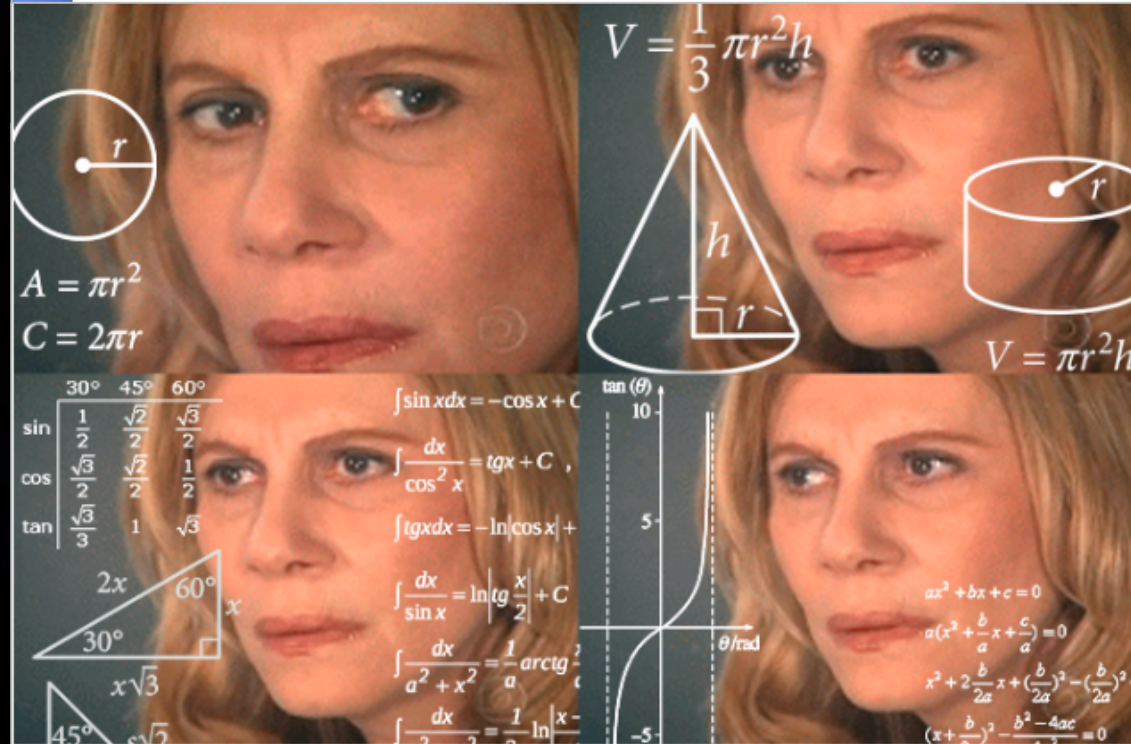
From Baby Boomers to Baby Doomers

- Global Challenges:
  - Geopolitical conflicts
  - Extreme climate events
  - Inequality
  - Steep rises in levels of inflation

- Gen Z's World:
  - Desire to drive change, particularly regarding climate change
  - Challenges: <u>Cost of living and financial concerns</u>
    - Almost half of Gen Zs (46%) and millennials (47%) live paycheck to paycheck and worry about being able to cover their expenses

(The Deloitte Global 2022 Gen Z and Millennial Survey, 2022)

Post-COVID Labor Market Boom & Bust

– Major shift from employee-driven market to one that is **extremely competitive**

2021 😷

Great Resignation

"Quiet Quitting"

Quiet Firing

2022

Loud Layoffs

Career Cushioning

The Value of a College Degree in the 21ˢᵗ Century

- Has gotten ***excessively expensive***
  - U.K. – ↑300% since 1998, average debt **£43,500**
  - U.S. – ↑500% since 1980s, average debt **$40,114**

- Has become ***less effective*** at preparing students for professional life after university
  - "[...] one in 10 (11%) business leaders strongly agree that college graduates have the skills [...] that their workplaces need." (Gallup, 2014)

- A proliferation of alternatives
  - Online courses, YouTube
  - Apprenticeships & direct training from companies

- ❖ Value of formal education = **Efficiency** & **Feedback**

TIME

THE INDENTURED GENERATION

We trampled their rights, tanked the economy, and trashed the planet for our benefit — but expect them to foot the bill

Why we call **them** narcissists

21st Century Skills

CONTENT
IS
KING

Bill Gates

"Framework for 21st Century Learning" (National Education Association, 2002)

Four Cs
- **C**ommunication
- **C**ollaboration
- **C**ritical Thinking
- **C**reativity

❖Distinct from traditional academic skills in being ***NOT primarily content knowledge-based***
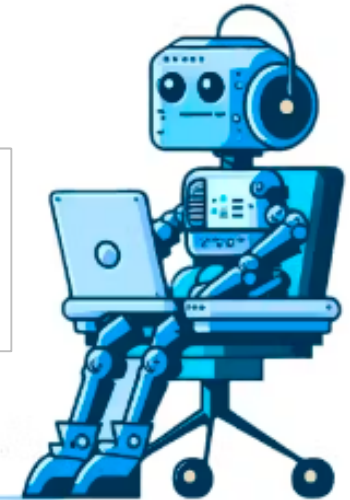
A New Era in What it Means to be 'Skilled'

– Modern economy increasingly defined in terms of **knowledge** or **creative work**

❖ Increased value on the ability to:

– *Process* massive amounts of **information** efficiently

– *Collaborate* effectively with **technology** to produce exceptional output

AI won't replace you.
Someone using AI will.

Warnings of mental health crisis among 'Covid generation' of students

Pandemic has had lasting impact on students' wellbeing and problem is getting worse, say UK experts

WHO highlights urgent need to transform mental health and mental health care

Report urges mental health decision makers and advocates to step up commitment and action to change attitudes, actions and approaches to mental health, its determinants and mental health care.

THE Times Higher Education

UK student mental health crisis 'may be worse than thought'

Study highlights significant under-reporting of anxiety and stress, with male and ethnic minority learners among least likely to seek help

AP

Youth mental health is in crisis. Are schools doing enough?

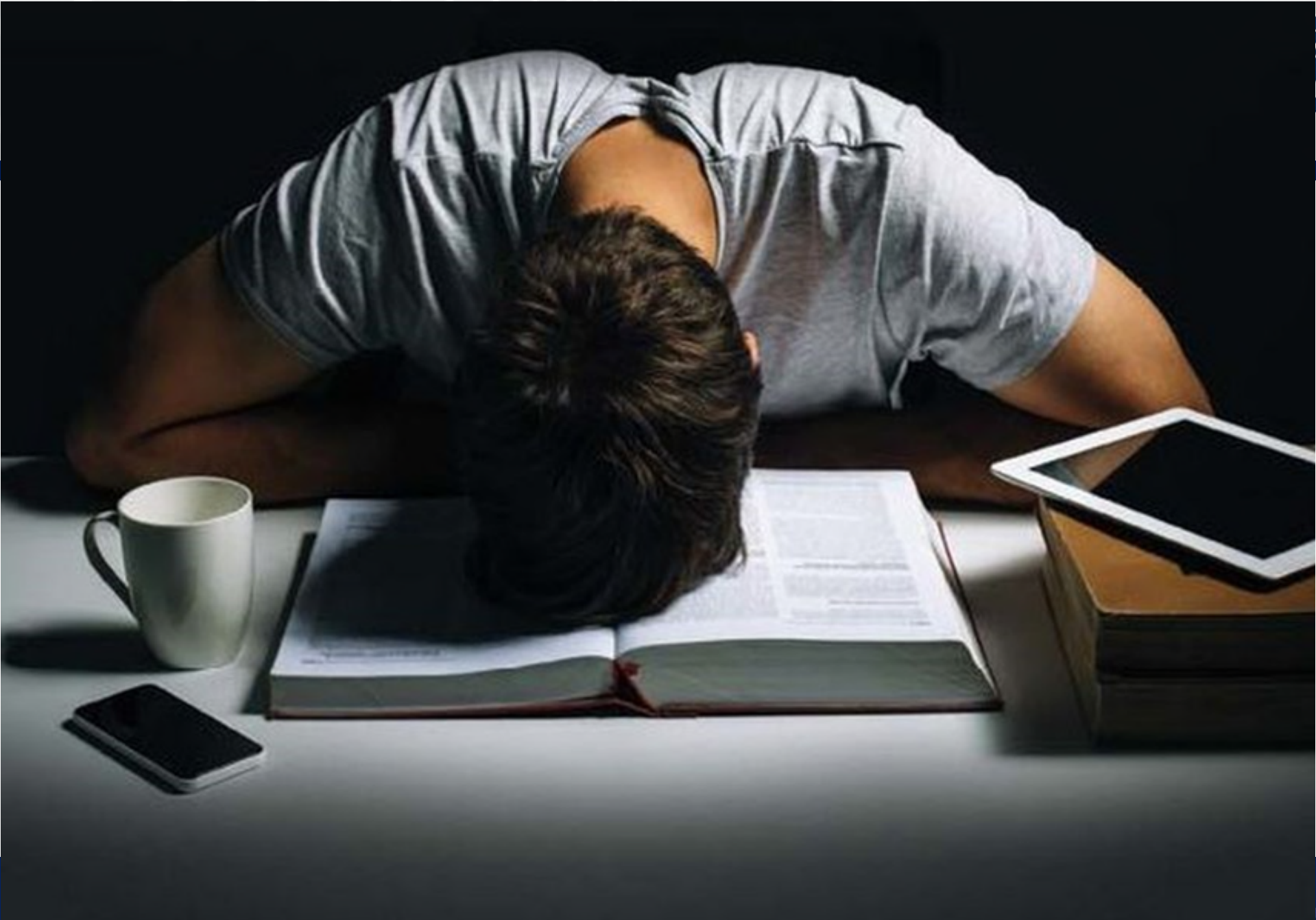By JOCELYN GECKER and DYLAN LOVAN   August 18, 2022

CDC Newsroom

Newsroom Home

CDC Newsroom Releases

2022 News

New CDC data illuminate youth mental health threats during the COVID-19 pandemic

DEPRESSION, SUICIDE RATES RISING

"LIFE OR DEATH": THE MENTAL HEALTH CRISIS AMONG U.S. TEENS

Published April 23, 2022   Updated April 25, 2022

One evening last April, an anxious and free-spirited 13-year-old girl

Standard Burger Basket
Standard Burger (Burger bun, hamburger patty, cheddar cheese, crispy onions, special sauce, red sauce) + Your choice of side + canned drink

Wonderful Burger Basket
Wonderful Burger (Burger bun, hamburger patty, fried mozzarella cheese, cheddar cheese, caramelized onions, pickled cucumbers, crispy onions, special sauce, red sauce) + Your choice of side + canned drink

Super Burger Basket
Super Burger (Burger bun, 270 gr hamburger patty, cheddar cheese, crispy onions, special sauce, red sauce) + Your choice of side + canned drink

Boss Burger Basket
Boss Burger (Burger bun, hamburger patty, cheddar cheese, crispy onions, smoked beef, sautéed mushrooms, pickles, special sauce, red sauce) + Your choice of side + canned drink

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Information Overload

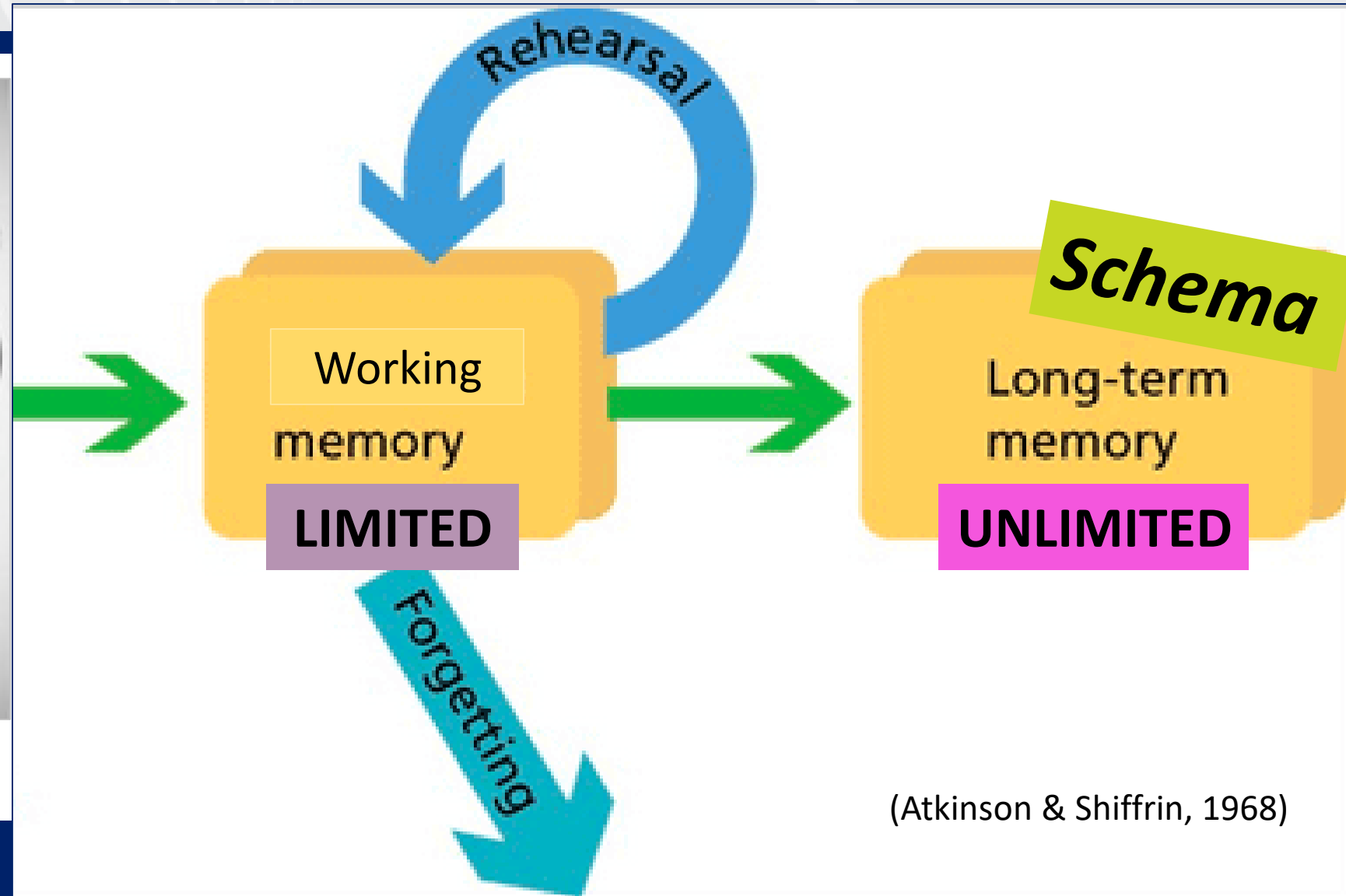"the state that occurs when <u>the amount or intensity of information</u> exceeds the individual's processing capacity, leading to anxiety, poor decision-making, and other undesirable consequences."
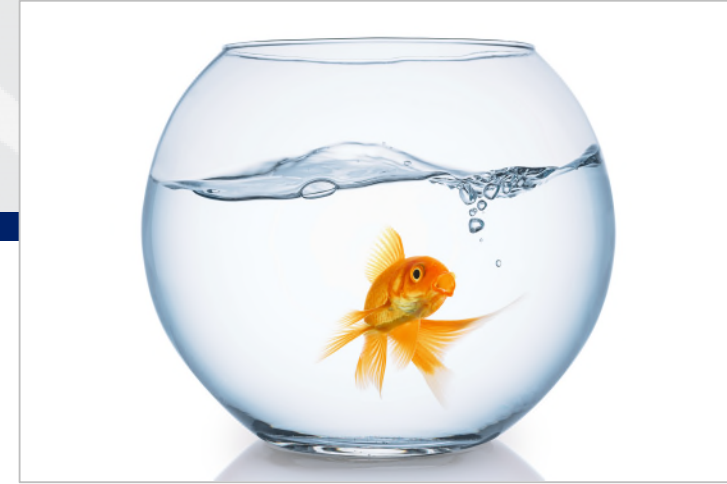
The Cognitive Architecture of Learning

Cognitive Load Theory (CLT)
(Sweller, 1988)

Rehearsal

Working memory
LIMITED

Forgetting

Schema

Long-term memory
UNLIMITED

(Atkinson & Shiffrin, 1968)

Limits of Cognitive Processing Capacity

- For **working memory**
  - **≤30 _Seconds_**, usually less
  - **7 ±2 '_Slots_'**, often less (Miller, 1956)

- Daily limit **for 'hard focus'** (Ericsson, 1998 in Newport, 2016)
  - ❖ A skill that needs to be consciously trained
  - _Novice:_ **1 hour**
  - _Expert:_ **up to 4 hours**, rarely more

Law of Diminishing Returns

Where High Producers Stop

Where Most People Realize They Need to Stop

Biggest Time Waster

Sources of Cognitive Load

Intrinsic & Extraneous Factors
- Task complexity
- **Redundant information**
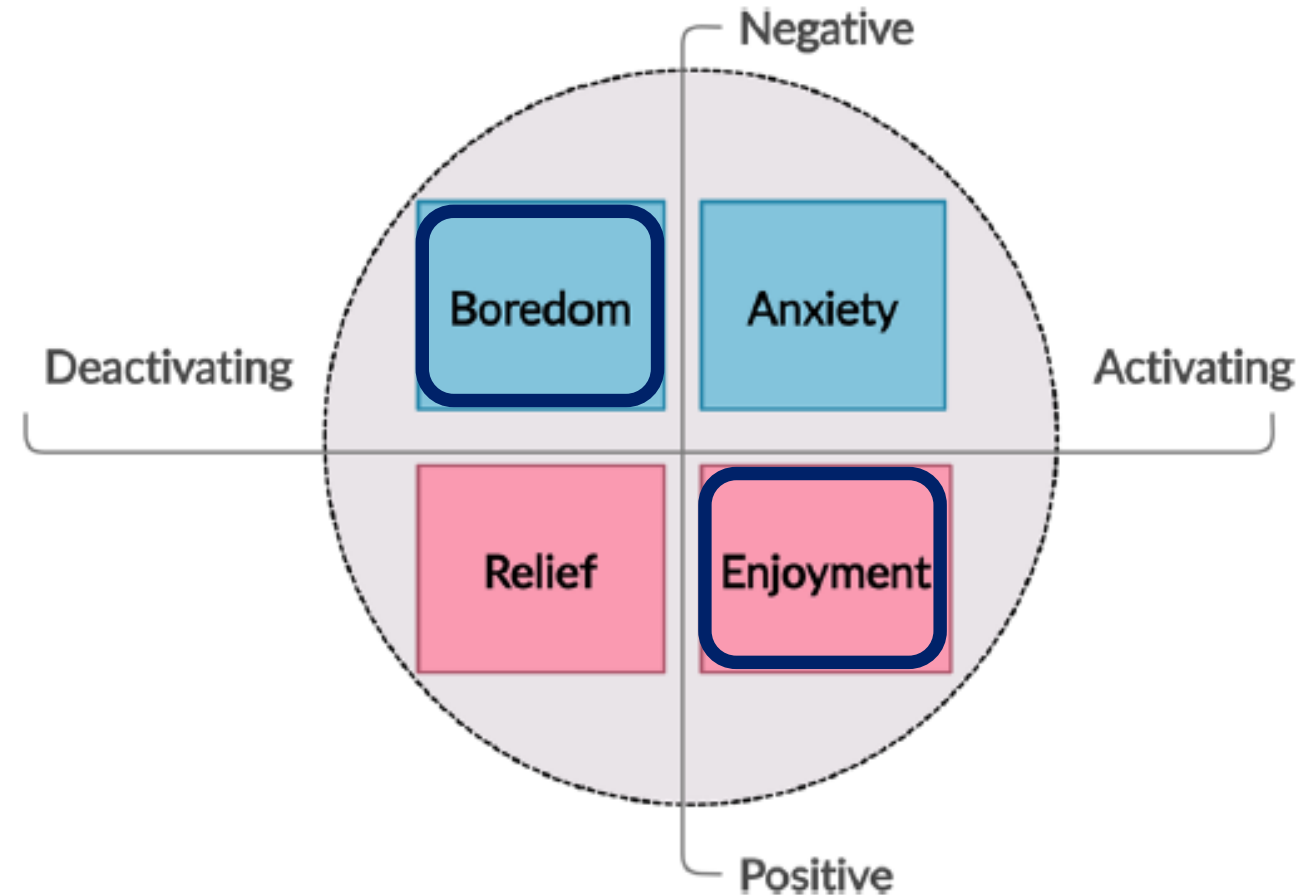- Time constraints

Learner-specific Factors
- Lack of
  - **prior subject knowledge**
  - language proficiency
  - technical skills
- Attitudes toward the subject
- Beliefs related to learning

(Shrivastav & Hiltz, 2013)

LREs & Achievement

= *learning-related emotions*

LREs → Achievement via:

- *Attention*
- *Motivation*
- *Self-regulation*

(Pekrun, 2006)
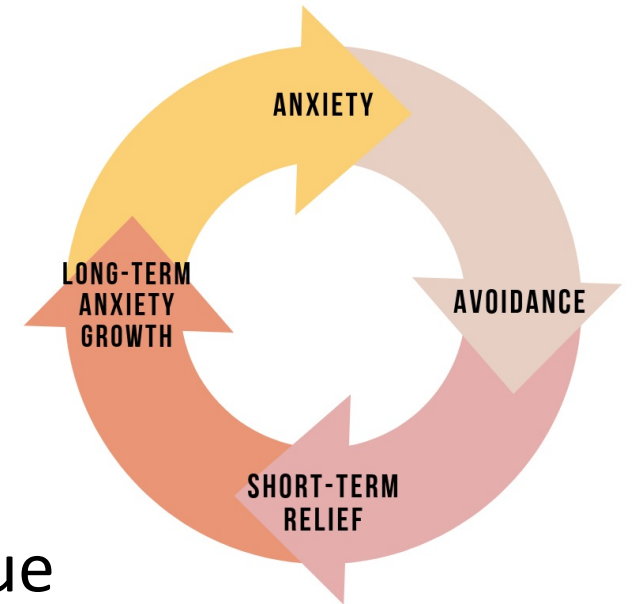
LREs in the Digital Classroom

"…a distinct overall emotional tone that differs from traditional educational settings." (Stephan, 2019)

- More boredom & anxiety
- Less enjoyment

- Cognitive Load → Boredom → Participation
- Anxiety → ↑Cognitive Load, resulting in mental fatigue

ANXIETY

AVOIDANCE

SHORT-TERM RELIEF

LONG-TERM ANXIETY GROWTH

(Tzafilkou et al, 2021)

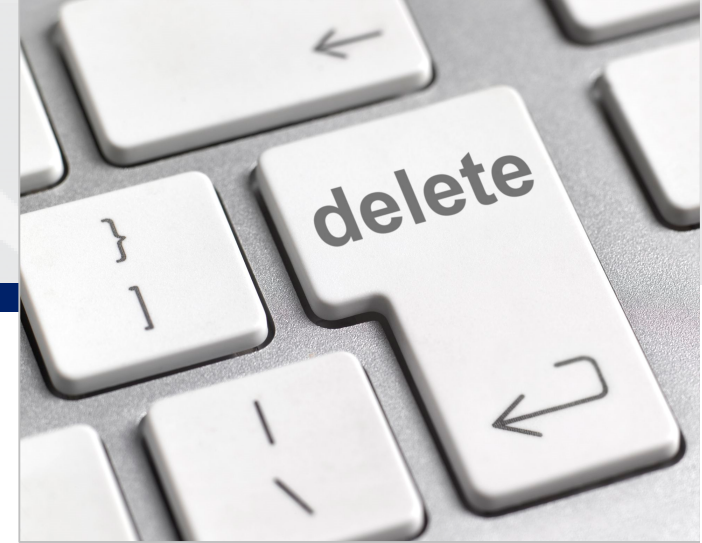# What can we do?

1) Get Our Priorities Straight

- Realign objectives with realities of labor market demands in terms of:
  - Content
  - Skills
  - Platforms/modalities

- Integrate soft skills training
  - Provide varied learning experiences,
  - Incorporate real-world scenarios
  - Cultivate a community of support and advice

Things That We Learn In School

- Useful Information
- Random Shit
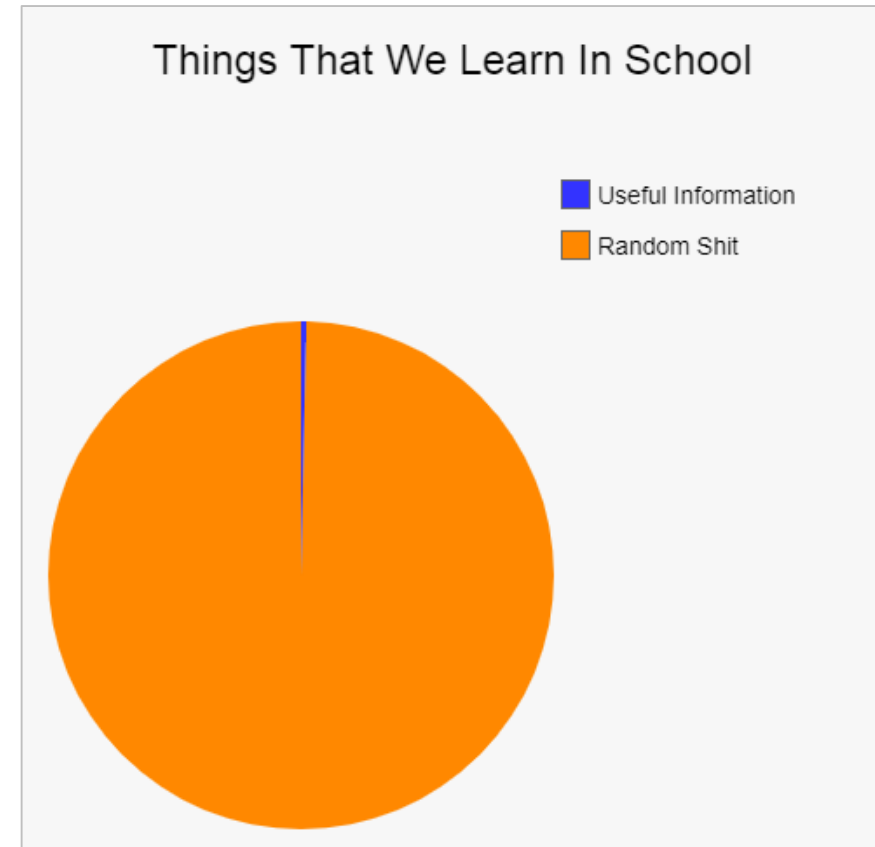
2) Hug the Delete Button

- *"Less but better"* – **achievable, useful, pleasant**

- Guiding Questions for <u>content</u>:
  - What is most important and relevant for today?
  - Could this be more visual or simplified?
  - If this is subtracted, will anything essential be missing?

- Optimize screen real estate: principles for <u>design</u>
  - F-pattern (for text), Z-pattern
  - Visual hierarchy
    - Size & scale, color & **contrast**
    - Headings & bulleted lists

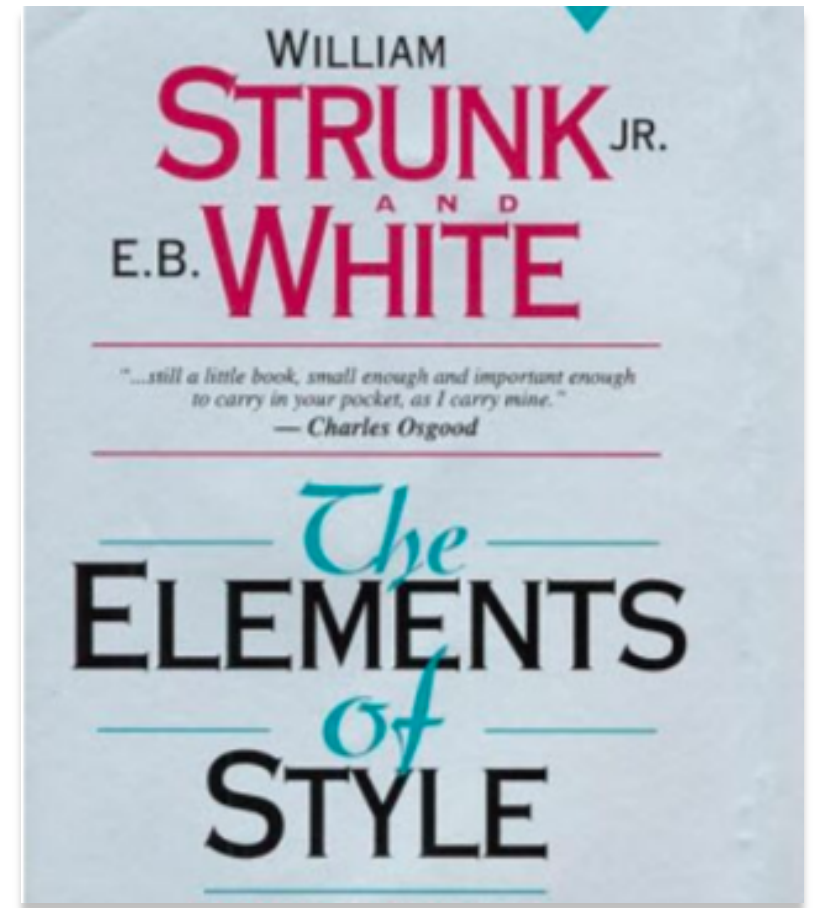- Differentiate between *compulsory* and self-study materials

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Burger Baskets

All served on a bun with cheddar cheese, crispy onions, and our special red sauce. Comes with your choice of side and drink.

| Standard	Wonderful	Boss
Just the basics	Fried mozzarella, caramelized onions, and pickled cucumbers	Smoked beef, sautéed mushrooms, pickles
*Supersize (270 gr) for £2		

3) Slow Your Roll

"Once appropriate information is stored in long-term memory, the capacity and duration limits of working memory are transformed and indeed humans are transformed.
***Tasks that previously were impossible or even inconceivable can become** trivially simple."*

(Sweller et al, 2011)

- Time-release information (e.g., in-class material, announcements)
  - What does my students' reality look like right now?
  - How are they likely to receive this information and/or take action?

- Build in opportunities for rehearsal and reflection
  - Spaced strategic repetition & feedback
  - E.g., eportfolios – for tracking progress over time
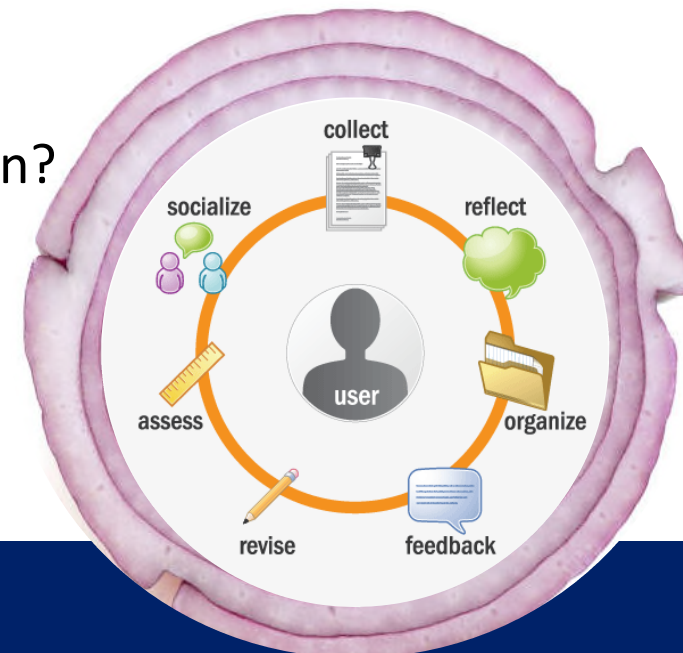
4) Break Down Complex Tasks

- Divide into smaller meaningful units
  - Schema activation (pre-, during, & post-activities for inputs)
  - Scaffolding to engage students in higher-ordered thinking

- Distribute through collaborative groupwork
  - "**collective working-memory effect**"
  - E.g., jigsaw readings, interactive tools
- ➢More active engagement & critical thinking

ChatGPT

Times Higher Education

ChatGPT as a teaching tool, not a cheating tool

How to use ChatGPT as a tool to spur students' inner feedback and thus aid their learning and skills development

⚠ Limitations

May occasionally generate incorrect information

May occasionally produce harmful instructions or biased content

Limited knowledge of world and events after 2021

Keep an Open Mind

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🙏 Thank you!

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