



Evaluating Wellbeing and Knowledge when using Digital and Intelligent Tools

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- **Challenges at a scale**
- **Brain adaptation (smaller volume)**
- **Brain power (implicit) expansion**
- **Digital/AI side-effects**
- **Co-existence**
- **Cognitive gain quadrants**
- **Cognitive gain evaluation**

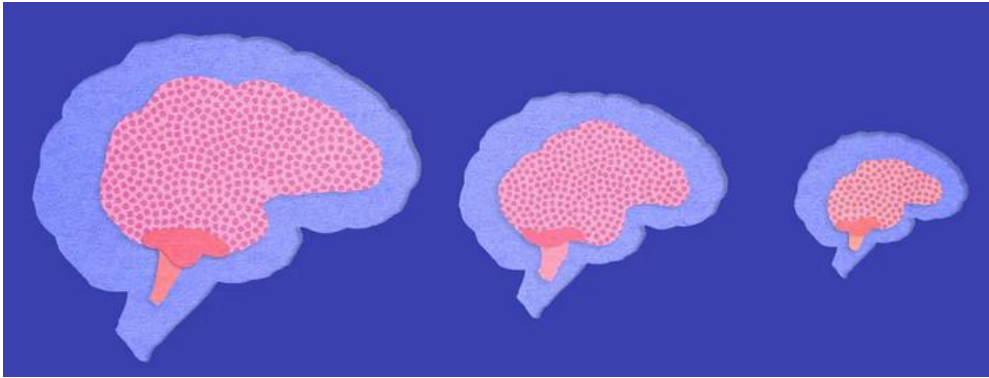
Well-being in Jeopardy!

The pace is too fast for humanity: there is no time to prepare and counter the side effects

- Wireless: Health-related Radiation impact (since '90s)
- Social Platforms: Bad Influencers, Indoctrination, Fake News (META for kids)
- Meta: The Mental Health danger of (Augmented) Virtual Reality
- All-digital devices: Hidden features (privacy, 3rd party subcontractors)
- Virtualization/remoteness: virtual/remote work leads to 7/24 workload, depression, anxiety, exhaustion, etc.
- No human-based activities; less direct socialization, leading to aloofness.
- Lack of Academic Curricula and Advanced Education on Digital-fluency
- Industry 5.0: Skill gaps, Economic disparities (market monopoly), Ethics (privacy), Job loss, Over-reliance on technology
- AI: Any AI-flavor tool can be detrimental if not misunderstood and use.
- Society; over-awareness kills the confidence and truth (tobacco, media, medicine, online digital, over-exposure, over-work, etc.)



<https://www.bbc.com/future/article/20240517-the-human-brain-has-been-shrinking-and-no-one-quite-knows-why>



The brain weighs about 2% of our body mass but consumes over 20% of our resting metabolic energy.

- **Symbolic thinking**
- **Complex societies**

The brains of modern humans are around 13% smaller than those of Homo sapiens who lived 100,000 years ago.

Certainly, when compared with other animals of a similar size, our brains are **gigantic**. The human brain has **nearly quadrupled in size in the six million years since our species last shared a common ancestor with chimpanzees**.

However, studies show this trend toward larger brains has reversed in Homo sapiens. In our species, average brain sizes have shrunk over the course of the last 100,000 years.

"This sort of **symbolic thinking** must have required a much more complex set of connections inside the brain than was present earlier. My suggestion is that having these *extra connections allowed the brain to function in a much more energy-efficient way.*"

DeSilva suggests that the birth of **complex societies** and empires meant that knowledge and tasks could be spread out. **People no longer had to know everything**, and as individuals no longer had to think as much to survive, their brains reduced in size.

So how can we explain this **striking reduction**? Tattersall suggests that the shrinkage of our brain size began around 100,000 years ago, which corresponds to a period of time in which humans **switched from a more intuitive style of thinking** to the terms "**symbolic information processing**" – or thinking in a more abstract way to better understand your surroundings.

Yet, we are becoming smarter

Humans Brain in Jeopardy!

- Our society changes, our behavior should, too!
- Extending our brains with technology tentacles
- We are already (SCI FI movies + Wearable & Implantable devices)
- Credits to Erik Buckman (buchmann@informatik.uni-leipzig.de)

Alien movies



Pop Art style

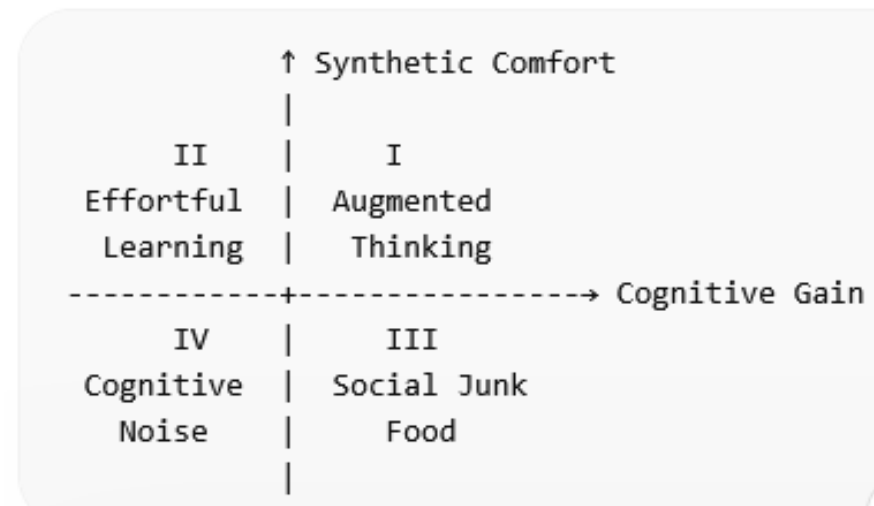




- | • Knowledge | Perception (+) | Side effects (-) |
|--------------|---|--|
| • Technology | VR/Immersion | G5/Electromagnetic vs. Environmental turbulence |
| • Digital | health - patient records
Immersive driving | digital hassle
digital pollution |
| • AI | health
vehicle
mining | no needs
no pains
no practice, no failures |
- **A** + brain enlightenment, by being exposed to unusual environment (brain expansion)
 - **A** - brain latency, brain confusion, decreasing agility on various functions
 - **Use cases:** (i) from planning ahead a trip on a paper to Immersive Google Map.
(ii) Knowing N, S,... (cardinal points); Knowledge vs. Compass
- Q:** Altering human emotions and judgements
Loosing acquired skills



Visual (conceptual positioning)



Q: NEED?

Am I leaving this interaction with a model,
or just with a feeling?

AI-entities tend to please, less argumentative, layers of never-ending advises, always not enough.



Visual (conceptual positioning)

Cognitive Gain vs Synthetic Comfort

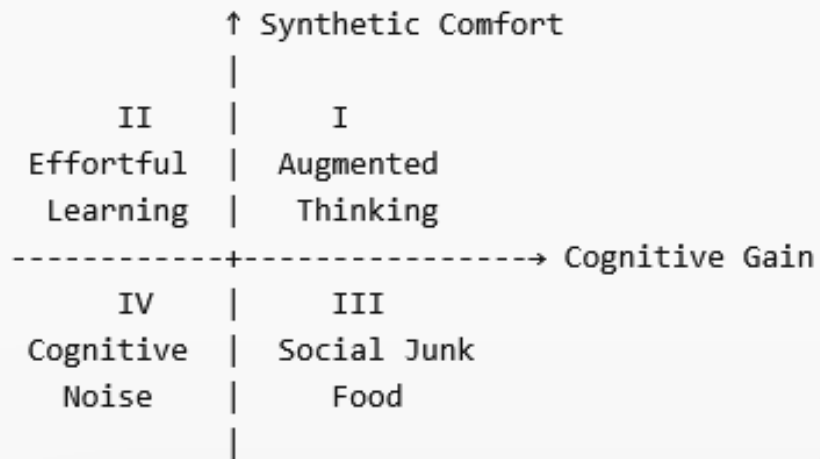
Axes Definition

- **X-axis: Cognitive Gain**

Degree to which the interaction produces **transferable understanding**
(models, abstractions, reasoning patterns, retained knowledge)

- **Y-axis: Synthetic Comfort**

Degree of **ease, fluency, emotional satisfaction, and frictionless engagement**
(pleasantness, speed, conversational smoothness, reassurance)



Minimal Reflection Protocol (10 seconds)

After an interaction, place it:

“Which quadrant was this?”

Then act:

I → Consolidate

II → Persist

III → Limit

IV → Exit





II. High Gain / Low Comfort — “Effortful Learning”

Profile: Challenging, sometimes frustrating, but cognitively transformative.

Risk: User abandonment (too demanding).

Guideline:

→ Treat discomfort as a **signal of depth**, not failure.

IV. Low Gain / Low Comfort — “Cognitive Noise”

Profile: Confusing, unhelpful, and frustrating.

Risk: Wasted time, erosion of trust.

Guideline:

→ Disengage quickly; refine prompt or switch source.

I. High Gain / High Comfort — “Augmented Thinking”

Profile: Efficient, pleasant, and intellectually productive interaction.

Risk: Subtle over-reliance due to *frictionless excellence*.

Guideline:

→ Periodically *reproduce insights without assistance* to preserve autonomy.

III. Low Gain / High Comfort — “Social Junk Food”

Profile: Pleasant, engaging, but shallow and non-transferable.

Risk: Addictive loops, illusion of productivity.

Guideline:

→ Time-box usage; ask: *What did I actually learn?*