

“We're becoming, in a word, shallower.”

—Nicholas Carr

**Technology: Is it Changing Us?**

Human beings, and our pre-human ancestors, always had

- ✓ an **incredible ability to create tools**, to craft instruments for survival (and entertainment). For most of human history, the growth of technology has been slow, but the advancement of technology in the modern era has been exponential.
- ✓ **short attention spans**: like many species, we’re always on high alert to possible dangers around us. The biological mechanism for fear-response is a primitive alert system that seems overwhelmed in today’s world (this was covered in last week’s lesson on anxiety; the part of our brains called the amygdala, which we’ll revisit in a future lesson on risk). Quick responses to (immediate) environmental dangers were part of our ancestors’ survival tools for millions of years, *and it’s still with us today*.

Add to this the inevitable **unintended (often destructive) consequences** of our actions and our creations, and we have a recipe for possible disaster, *despite our best intentions*.

It’s fair to say, by studying human history, that a significant invention can alter society, our world view, *and the way we think* (remember our lesson on science and paradigm shifts and the consequences of an invention like the telescope). Creativity and inventiveness are human characteristics that have given us an edge in surviving the unforgiving environments of our past, but are there inventions, *like the internet-based world of today*, that can hinder our thinking abilities ... and our survival?

Nicholas Carr (in his book *The Shallows*) describes four forms of technology:

<b>Physical</b> <b>(extend muscle power)</b>	<b>Sensory</b> <b>(extend observation)</b>
Weapons, tools, wheel, cars, airplanes	Telescope, microscope, Geiger counter, infrared imaging
<b>Modification of Nature</b> <b>(change biology, environment)</b>	<b>Intellectual</b> <b>(“enhance” the mind)</b>
Genetic modification, dams, medicines, reservoirs	Computer, <b>internet</b> , maps, clocks, books, radio, TV

You can probably imagine an overlap between sensory and intellectual technologies (think of a smart phone, or the availability of sensory tools accessible via the internet).

- ✓ Can you think of a connection of the other two categories to changes in the way we think?
- ✓ In your opinion, which invention has had the greatest detrimental effect on human intelligence?

When a new technology becomes part of our society, there is **gain or benefit(s)**, but there is also **loss or a diminishment of something in our lives** (from Neil Postman, media theorist). The key question is to ask whether the gain-loss scale balances out or are we reaching the point where the benefits diminish drastically? Or, are we over-reacting to a new, inevitable paradigm?

- ✓ Think of a technology you use and think of how it's affecting your thinking and how your life would be different (better perhaps?) if that technology didn't exist. What did you gain and what did you lose?

Today, our addictive **intellectual technology**, our shortening attention spans, and our amplified fears are in a **feedback loop** that (with growing evidence) is changing our thinking, remodeling our brains physically, and altering our behaviour on an individual and social scale.

The question that ties our first two units of this course and today's topic is the following:

**Are the effects of modern intellectual technology  
(the influence of the internet-based world)**

**CHANGING**

***our thinking and the way we perceive the world?***

The short, immediate answer appears to be 'yes,' but a lot of these studies are in their early stages. On the positive side, the observed harm seems reversible.

### **Some Key Points from the Carr reading (please do this reading as it's very short):**

The **overuse** of the internet or **overdependence** on all of this overwhelming digital information:

- ✓ Is turning us into **superficial (shallow) thinkers** (we miss the big picture).
- ✓ Is affecting our ability to concentrate or focus; it's affecting our cognitive (thinking) abilities.
- ✓ We really aren't any good at multitasking ... but, some skills are enhanced so it's not all bad.
- ✓ **Is rewiring the circuitry of our brain** ("By changing our habits of mind, each new technology strengthens certain neural pathways and weakens others." Carr). The ability of the brain to physically change is called **neuroplasticity** and it's not just a response to our modern technology. Some current studies indicate that the brain can be "rewired" or reprogrammed by the effect of environment, disease, our own ways of thinking or thought patterns (see the anxiety lecture of last week), or exposure/overuse of certain intellectual technologies. ***In short, the way we think may be altered and our brain can remodel itself.***

### **Patterns of Perception**

- ✓ Complaints about the effects of the latest gadgets on human behaviour and intelligence can be traced back thousands of years, each generation complaining about the younger generation getting lazier and dumber. It may be easy to dismiss the latest concerns about our digital world as nothing more than the usual generational griping, but scientific evidence is beginning to show that there may be something there ...
- ✓ Carr focuses on the effects of the internet (and all that entails); his worldview in his article and books comes to us from the early days of 2010 and 2014; the effects of the then, somewhat new, **social media** environment weren't as pronounced or disturbing as today.
- ✓ Before Carr, in the age of TV (pre-internet, pre-streaming, pre-smart phones, pre-googling whatever question crossed your mind ...), these concerns were also raised by Marshall McLuhan, famous for the phrase "**The medium is the message.**" (*Understanding Media: The Extensions of Man*, 1964). **The medium is the tech used to deliver information and the medium begins to redefine the way we think—a technology is not neutral in its effect.** What does this mean? The medium itself has social ramifications as it becomes part of our lives, and it affects the way we interpret information.

**The technology of media not only transports information to you,  
it can transform who you are!**

## **Out with the Old ...**

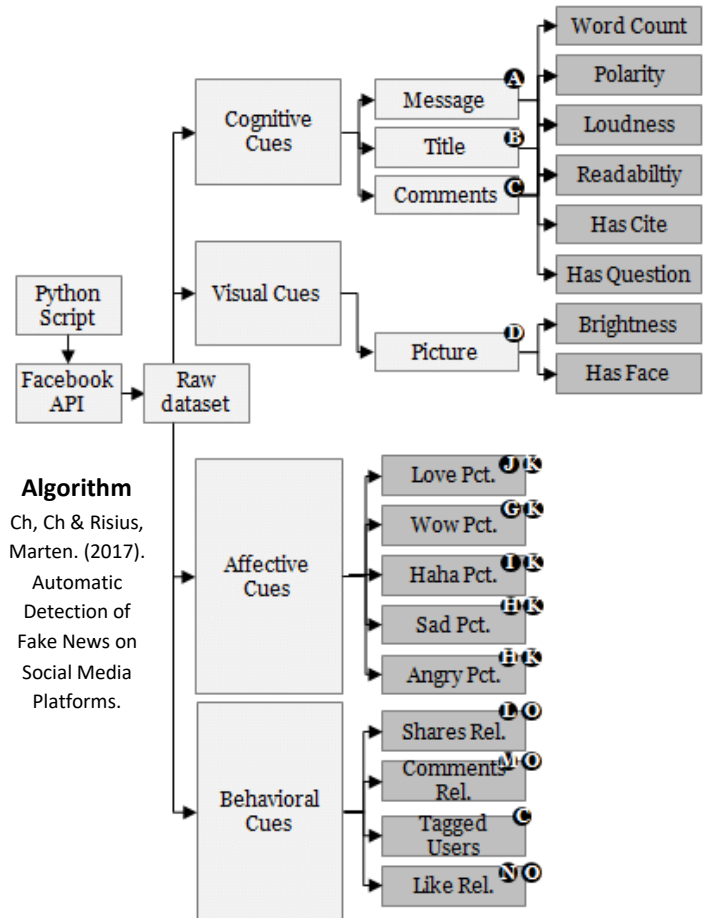
- ✓ Books, Newspapers, Maps, Phones, Radio, TV, Computers ... all have shaped our view of the world, but this older tech has been absorbed within the body of the digital world (the internet) and with greater impact. Where do you watch TV shows now? Where do you get your news? How do you perform financial transactions? How do you communicate?
- ✓ The old technologies become redefined in terms of the new media (Postman, Carr); static phrases and linear information become hyperlinks, moving images, dynamic video, attractive headlines (tantalizing and outrageous, feel-good and enraging), targeted information, a deluge of advertising streamlined for your online behaviour, (superficial) summaries of books, movies, TV plots, etc.).
  
- ✓ Consequences?
  - → greater efficiency in the way information is delivered and immediacy of information from around the world.
  - → **overwhelming amount of information**, from news feeds to entertainment to full textbooks on every subject to the digitized history of humanity, etc.
  
- ✓ How have we changed?
  - → **diminished attention span**
  - → loss of concentration and focus; we skim over information (studies of eye tracking patterns, even going back to the early days of the internet, show that most people skim-read across a site in F or Z-patterns, missing a lot of the context (Neilson Norman Group))
  - → inability for deep, contemplative thought
  - → different pace of learning, reading, thinking ...
  - → loss of patience
  - → easier acceptance of misinformation and disinformation
  - → overreliance on the digital realm to bolster our identity ... to feel good, to belong and be accepted in a group ...
  - → greater irritability, fear, anger, outrage, hatred ... which brings us to ...

### Social Media (Emotional Technology?)

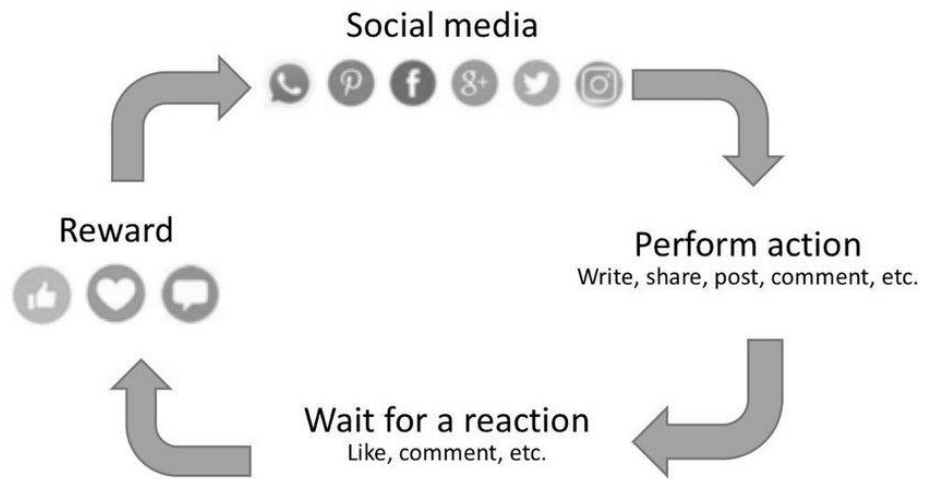
Most people get their news/information from **social media**, surpassing traditional media such as

TV, radio, and newspapers (Pew Research). What is a consequence of this? What if our diminishing attention span does not take us beyond a headline? If we don't think critically about what we see and read, how can we be sure of what is true and real in today's world of competing proclamations of truth? An interesting study of the effect of social media on shaping the way we think and behave is in Max Fisher's book “The Chaos Machine” from Little, Brown and Company, 2022. The following are some interesting points from this book:

- ✓ The [algorithms](#) of social media are designed to create more engagement, to grab more attention ... more attention means more time on the platform and more exposure to ads ... more profit ... and the company can sell even more ad space. It's easy to create more engagement by providing divisive content in recommendations. Outrage is a great motivator, as is the approval of other people (groups) and our bonding to these groups becomes part of our social identity.
- ✓ You are (“news”) fed what interests you, shaping your experience, nudging you down different information pathways (or rabbit holes).



- ✓ **Social-validation feedback loop:** You can also post and get feedback, more acknowledgments, encouraging you to post more, get more feedback, generating a **dopamine** hit; dopamine is a neurotransmitter (brain chemical) associated with pleasure. Once you get acclimated to a level of response and that buzz wears off, you'll want more, a stronger hit, **like a drug addiction**.



Makalesi et al. (2019). A Research On Social Media Addiction and Dopamine Driven Feedback. 5. 882-897.

- ✓ **Digital amplification:** Views are amplified, sometimes creating the illusion that a small (loud) fraction of the population represents a far larger group; there is a power to conform, be part of the group, reinforce a social identity ... and contrast it with "the other." This amplification can give the impression that there is truth in numbers, the sense that this many people may be on to something real.
- ✓ We have many groups in their own **echo-chambers** with like-minded people, having their worldview reinforced by the others in their own "community." Think of the similarities to the *Allegory of the Cave* and the prisoners believing that the shadows are the only reality. Now multiply the number of caves and the number of prisoners by the thousands, all amplified by fear and hate. Someone says something different or contrary to the accepted views of a group, well, you remember Plato's story ...
- ✓ **And this is all available and accessible on apps on your phone, in the palm of your hand, awaiting your engagement.**

### **Technological Addiction?**

- Check out this older study which has been reinforced in the last decade:  
<http://withoutmedia.wordpress.com/>
- Study of 200 students at University of Maryland/Feb. 24-Mar. 4, 2010, who had **no media access for 24 hours**

- Expanded to study of 1000 students around the world  
<http://theworldunplugged.wordpress.com/> : No media for 24 hours
- **Reactions: 'Addiction,' Failure, Boredom, Confusion, Distress, Isolation**
- Some recent studies demonstrate that the brains of individuals with addictions (drugs, alcohol, ...) are like the brains of those addicted to the internet (surfing, networking, gaming, ...), where MRI scans show the same **physical deterioration in parts of the brain**, no matter what your addiction is.

### What's the Good News?

Our technology does provide us with incredible benefits, so it's a bit simplistic to say we should get rid of it (note: we can't), but experiments (<https://web.stanford.edu/~gentzkow/research/facebook.pdf>) suggest that the **reduction** in our use of internet-connected devices and applications can undo some of the harmful effects; the rewiring of the brain is not permanent (as expected, from the ideas of neuroplasticity). Less internet use can lead to:

- ✓ Reduction of stress hormones and depression
- ✓ Reduction of the triggers that produce outrage (typically political)
- ✓ An improvement to memory
- ✓ An improvement in sleep habits
- ✓ More contact time with friends and family (in the real world)
- ✓ A boost to academic performance
- ✓ **A Happier Person!**

#### For Testing

- ✓ Cognitive Abilities and the Effects of Information Technology
- ✓ "The medium is the message"
- ✓ Different technologies: Physical, Sensory, Modification of Nature, Intellectual
- ✓ Neuroplasticity
- ✓ Effects of social media
- ✓ Technological addiction
- ✓ Shallow thinking
- ✓ Multitasking
- ✓ Social-validation feedback loop
- ✓ Digital amplification

"Cogito ergo sum (I think, therefore I am.)"

— René Descartes

"Five percent of the people think;  
ten percent of the people think they think;  
and the other eighty-five percent  
would rather die than think."

— Thomas A. Edison

"He who thinks little, errs much."

— Leonardo da Vinci