

# IT Ethics: A Philosophical History

## Technology, Power, and Human Choices

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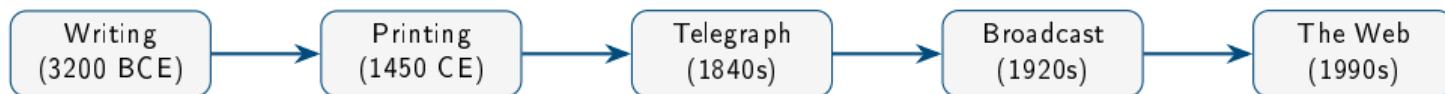
- **Information Technology (IT)** refers to any tool or system humans use to create, store, communicate, or process information—from ancient writing to modern AI.
- Throughout history, new information technologies have transformed societies, economies, and the way humans relate to one another.
- Each technological revolution raises profound **ethical questions**: Who benefits? Who is harmed? Who controls access to information?
- This course examines five major IT revolutions to understand the challenges we face today with social media, AI, and digital platforms.

## Core Question

How do we make wise choices about technologies that reshape what it means to be human?

# What Is Information Technology?

- **Information** is any data, knowledge, or content that can be communicated, stored, or processed by humans or machines.
- **Technology** comes from the Greek *techne* (craft or skill) and refers to tools and techniques humans create to extend their capabilities.
- Information technology includes both **hardware** (physical tools like clay tablets, printing presses, and smartphones) and **software** (systems of symbols, codes, and procedures).



# What Is Ethics? (And Why Does IT Need It?)

- **Ethics** is the branch of philosophy that studies questions about right and wrong, good and bad, and how we ought to live and treat others.
- Unlike laws (which vary by country) or customs (which vary by culture), ethics asks what *should* be the case, not just what *is* the case.
- IT ethics matters because technology is never neutral—every design choice embeds values and affects who has power over information.
- We need ethical thinking because technology changes faster than laws, and engineers and users must make choices before regulators catch up.

## Example: The “Like” Button

Facebook's designers chose to create a “Like” button but no “Dislike” button. This design choice shapes how millions of people communicate, favoring positive reinforcement over critical feedback. Was this a neutral technical decision, or an ethical one?

# Five Revolutions in Information Technology

- A **technological revolution** occurs when a new tool fundamentally changes how societies create, store, and share information, reshaping power structures and daily life.
- Each revolution brings genuine benefits (wider access, new capabilities) alongside serious risks (new forms of control, unintended harms, lost skills).
- The five revolutions we will study span over 5,000 years, yet each raises surprisingly similar ethical questions about access, truth, and power.
- Understanding these patterns helps us recognize that today's debates about AI and social media are not entirely new—they echo ancient concerns.

Revolution	Era	Key Innovation
Writing	3200 BCE	External memory storage
Printing Press	1450 CE	Mass reproduction of texts
Telegraph/Phone	1840s–1870s	Instantaneous distance communication
Broadcast Media	1920s–1950s	One-to-many mass communication
The World Wide Web	1990s	Global networked information

# The First Revolution: Writing

- **Writing** is a system of visual symbols that represents spoken language, allowing information to be stored outside the human mind for the first time.
- Writing emerged independently in at least three locations: Mesopotamia (cuneiform, c. 3200 BCE), Egypt (hieroglyphics, c. 3200 BCE), and China (oracle bones, c. 1200 BCE).
- This technology solved a fundamental problem: human memory is limited, fallible, and dies with the individual, but written records can persist for millennia.
- The invention of writing marks the boundary between **prehistory** (known only through archaeology) and **history** (known through written records).

## A Radical Change

For the first time, knowledge could travel across space without a messenger and across time without continuous oral transmission. This single innovation made civilization as we know it possible.

# Before Writing: How Oral Cultures Preserved Knowledge

- **Oral cultures** relied entirely on human memory and face-to-face communication to preserve and transmit knowledge across generations.
- These societies developed sophisticated techniques for memory: rhythm, rhyme, repetition, formulaic phrases, and narrative structures that made information memorable.
- Epic poems like the *Iliad* and *Odyssey* were composed and transmitted orally for centuries before being written down, using metrical patterns as memory aids.
- Oral transmission required active participation—listeners became tellers—creating a dynamic, living tradition rather than a fixed text.

## Characteristics of Oral vs. Literate Cultures

- **Oral:** Knowledge is embodied in people; learning requires personal relationships; traditions evolve organically with each retelling.
- **Literate:** Knowledge exists in objects; learning can occur alone; texts remain fixed but may lose living context.

# The Invention of Writing: Mesopotamia, Egypt, China

- **Cuneiform** (Mesopotamia, c. 3200 BCE) began as pictographs on clay tablets for recording trade and taxes, evolving into wedge-shaped marks representing sounds.
- **Hieroglyphics** (Egypt, c. 3200 BCE) combined pictorial symbols with phonetic elements, used for religious texts, monuments, and administration.
- **Chinese script** (c. 1200 BCE) developed from oracle bone inscriptions used for divination, becoming a logographic system still in use today.
- In each case, writing emerged first to serve practical needs—accounting, religion, governance—before expanding to literature, history, and philosophy.

System	Region	Date	Original Purpose
Cuneiform	Mesopotamia	c. 3200 BCE	Trade records, taxes
Hieroglyphics	Egypt	c. 3200 BCE	Religious texts, monuments
Oracle Bone	China	c. 1200 BCE	Divination, royal records

# Plato's *Phaedrus*: An Ancient Critique of Writing Technology

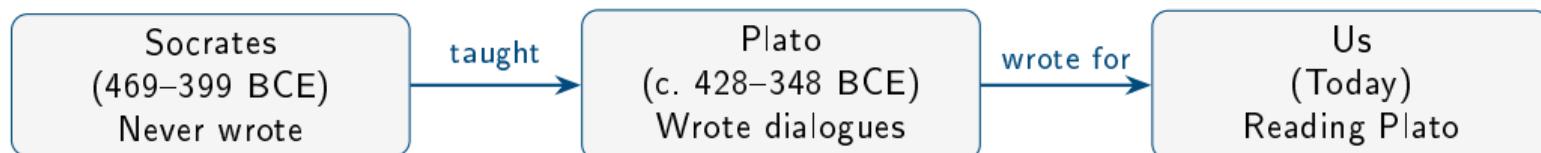
- Plato (c. 428–348 BCE) was an Athenian philosopher who recorded his teacher Socrates's ideas in philosophical dialogues.
- In the *Phaedrus* (c. 370 BCE), Socrates tells a myth: the Egyptian god Theuth invents writing and presents it to King Thamus as a gift to improve memory and wisdom.
- King Thamus rejects it, warning that writing will create **external dependence**—people will trust symbols “which are no part of themselves” instead of cultivating internal memory.
- Socrates argues writing produces the **appearance of wisdom without the reality**: readers will “appear to be omniscient” while actually knowing nothing deeply.
- Unlike a living teacher, a written text cannot respond to questions or adapt to different learners—it “preserves a solemn silence.”

## Plato, *Phaedrus* (c. 370 BCE)

“This discovery of yours will create forgetfulness in the learners' souls, because they will not use their memories; they will trust to the external written characters and not remember of themselves.”

# The Irony: We Only Know This Because Plato Wrote It Down

- Socrates himself never wrote anything—all of his ideas survive only because his student Plato chose to write them down in dialogue form.
- This creates a profound **performative contradiction**: the argument against writing is preserved and transmitted across 2,400 years *because it was written*.
- If Plato had followed Socrates's advice and refused to write, we would know nothing of Socrates's philosophy, including his critique of writing itself.
- This irony suggests that the relationship between technology and human flourishing is more complex than simple acceptance or rejection.



# Writing and Empire: Bureaucracy, Law Codes, and Power

- Writing enabled **bureaucracy**—the administration of complex societies through standardized records of taxes, land ownership, military service, and legal judgments.
- The earliest law codes, such as the **Code of Hammurabi** (c. 1754 BCE), used writing to make laws public, permanent, and (theoretically) applicable to all citizens equally.
- Empires from Assyria to Rome depended on written communication to coordinate armies, collect tribute, and govern distant provinces without the ruler being physically present.
- Writing created a new class of **gatekeepers**—scribes and priests who controlled access to literacy and thus wielded enormous social power.

## The Double Edge of Written Law

Written law codes made rules transparent and consistent—but they also enabled more systematic control over populations. The same technology that protects citizens' rights can enforce totalitarian rule.

# Discussion: What Does the Writing Revolution Teach Us?

- Socrates worried that writing would make people dependent on external memory and give them false confidence in their own knowledge.
- Writing enabled unprecedented preservation of knowledge, coordination of complex societies, and the rule of law—but also new forms of surveillance and control.
- The “scribal class” became powerful gatekeepers, controlling who could access and produce written information.
- Every benefit of writing (permanence, reach, precision) came with a corresponding risk (rigidity, loss of context, exclusion of the illiterate).

## Discussion Questions

- ① Was Socrates right that we lose something important when we externalize memory? Think about GPS, calculators, and search engines.
- ② Who are today’s “scribes”—the gatekeepers who control access to information technology?
- ③ Can you think of a modern technology that, like writing, has both liberated and controlled people?

# The Second Revolution: The Printing Press

- For over 4,000 years after writing was invented, every copy of a text had to be made by hand—a slow, expensive, error-prone process that kept books rare and costly.
- Johannes Gutenberg** (c. 1400–1468) developed **movable type** printing in Mainz, Germany around 1450, combining existing technologies into a system for mass production.
- Gutenberg integrated the screw press (from wine-making), oil-based ink, and metal alloy letter molds to produce thousands of identical characters that could be arranged and rearranged.
- The **Gutenberg Bible** (c. 1455) demonstrated that printed books could match manuscript quality, launching a revolution that would reshape religion, science, politics, and culture.



## The Impact: Books Become Cheap and Abundant

- Before printing, a single book might cost as much as a house—each copy required months of labor by trained scribes in monastery scriptoriums.
- The printing press reduced book costs by approximately 80% within its first century, making written knowledge accessible to merchants, professionals, and eventually ordinary citizens.
- By 1500—just 50 years after Gutenberg—an estimated 20 million books had been printed across 250+ European cities, surpassing all manuscripts produced in the previous thousand years.
- This flood of books created new industries (publishing, bookselling), new professions (editors, typesetters), and new problems (piracy, misinformation, censorship).

Year	Print Centers	Estimated Books Printed
1455	1 (Mainz)	First Bible printed
1480	110+ cities	Millions of pages
1500	250+ cities	~20 million volumes

# Two Philosophers of the Printing Press: Erasmus and Luther

- **Desiderius Erasmus** (c. 1466–1536) and **Martin Luther** (1483–1546) were the two most widely read authors of the early print era—and corresponded with each other about reform and the power of print.
- Both championed vernacular Bibles and criticized Church corruption, but they disagreed fundamentally about *how* print should be used and *who* should read what.
- **Erasmus:** Believed print should serve **gradual reform** through scholarly dialogue in the “Republic of Letters”—education and reason would peacefully persuade elites to change.
- **Luther:** Believed print should enable **immediate revolution** by bypassing gatekeepers entirely—short, vernacular pamphlets could reach ordinary people and spark mass action.

	<b>Erasmus</b>	<b>Luther</b>
Audience	Educated elites	Common people
Strategy	Gradual reform	Immediate revolution
Tone	Irony, moderation	Passion, confrontation
Format	Letters, scholarly editions	Pamphlets, vernacular texts
Goal	Republic of Letters	Mass mobilization
Legacy	Intellectual dialogue	Protestant Reformation

# The Good: Vernacular Bibles, Scientific Revolution, Mass Literacy

- The printing press enabled **vernacular Bibles**—translations into German, English, French, and other languages—allowing ordinary people to read scripture without relying on clergy as intermediaries.
- The **Scientific Revolution** depended on print: Copernicus, Galileo, and Newton could share precise diagrams, tables, and mathematical proofs that were reproduced identically across thousands of copies.
- Print created demand for **mass literacy**: as books became affordable, reading became a practical skill for merchants, craftsmen, and eventually children in newly established schools.
- Standardization of texts meant that scholars in London and Prague could discuss the exact same edition, enabling collaborative knowledge-building across vast distances.

## Benefits of Print

Vernacular  
Bibles

Scientific  
Revolution

Mass  
Literacy

Standardized  
Knowledge

# The Dark Side: Propaganda, Conspiracy, and Witch-Hunting Manuals

- The same technology that spread scientific knowledge and vernacular Bibles also mass-produced **propaganda**, conspiracy theories, and instructions for persecution.
- The *Malleus Maleficarum* (“Hammer of Witches,” 1487) became one of the most reprinted books in Europe, providing detailed instructions for identifying and prosecuting “witches.”
- Pamphlets spread false accusations against religious minorities, including blood libel myths claiming Jews murdered Christian children—lies that fueled pogroms across Europe.
- Print made rumors permanent and portable: a lie could now travel faster than any correction, reaching audiences who would never encounter a rebuttal.

## A Sobering Lesson

The printing press did not distinguish between true and false, helpful and harmful. It amplified *whatever people wanted to read*—including hatred, fear, and superstition.

# Luther's *On the Jews and Their Lies*: When Ideas Have Consequences

- In 1543, Martin Luther published *On the Jews and Their Lies*, a 65,000-word treatise calling for the destruction of synagogues, confiscation of Jewish property, and forced labor or expulsion.
- Luther recommended that synagogues and schools “be set on fire,” homes “razed and destroyed,” and rabbis “forbidden to teach henceforth on pain of loss of life and limb.”
- The printing press ensured this text survived and spread for centuries; four hundred years later, the Nazis displayed it at Nuremberg rallies and cited it to justify anti-Jewish legislation.
- This case illustrates a crucial point: the same person can produce both liberating ideas (religious reform) and deeply harmful ones—and print preserves both equally.

## Historical Consequence

Kristallnacht (November 9–10, 1938)—when Nazis burned synagogues across Germany—occurred on Luther’s birthday. Bishop Martin Sasse published a pamphlet connecting Luther’s 1543 recommendations to their “fulfillment” by the Nazis.

# The Thirty Years' War: Information Technology and Mass Death

- The **Thirty Years' War** (1618–1648) was one of the most destructive conflicts in European history, killing an estimated 4.5 to 8 million people—approximately 20% of the German population.
- The war began as a religious conflict between Catholics and Protestants, fueled by decades of printed propaganda, pamphlet wars, and competing interpretations of scripture.
- Printed materials dehumanized enemies, spread atrocity stories (real and fabricated), and made compromise seem like betrayal of sacred principles.
- The Peace of Westphalia (1648) ended the war but settled religious questions almost exactly as they had been resolved in 1555—before the bloodshed began.

## The Human Cost

4.5–8 million deaths

20–50% population loss

1,500+ towns destroyed

30 years of warfare

# Discussion: What Does the Printing Press Teach Us?

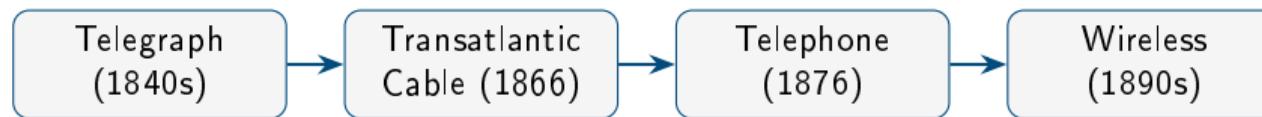
- The printing press enabled the Scientific Revolution, mass literacy, and religious reform—but also propaganda, conspiracy theories, and religious wars that killed millions.
- Erasmus dreamed of a “Republic of Letters” where scholars would share knowledge peacefully; Luther showed that print could bypass gatekeepers and reach mass audiences directly.
- The technology itself was neutral; its effects depended on what people chose to print, who could afford to publish, and what audiences wanted to read.
- The gap between Gutenberg (1450) and the Peace of Westphalia (1648) was almost 200 years—societies needed generations to develop new norms, institutions, and literacies.

## Discussion Questions

- ① What parallels do you see between the printing press and social media? What's different?
- ② Luther's ideas spread because they resonated with what people already felt. Is “going viral” more about the message or the medium?
- ③ If it took 200 years to adapt to print, how long might it take to adapt to digital media?

# The Third Revolution: Telegraph, Telephone, and Mass Literacy

- The **long nineteenth century** (roughly 1789–1914) saw an explosion of new information technologies that shrank distances and expanded access to knowledge.
- The **telegraph** (1840s) enabled near-instantaneous communication across continents—the first time information could travel faster than a human being.
- The **telephone** (1876) made real-time voice communication possible, transforming business, government, and personal relationships.
- **Mass literacy campaigns** and compulsory education created millions of new readers, while cheap newspapers (the “penny press”) made daily news accessible to working people.



# New Technologies: Shrinking the World

- Before the telegraph, news from London to New York took at least ten days by ship; after the transatlantic cable (1866), it took minutes.
- These technologies created new industries (news agencies, telephone companies), new professions (telegraph operators, telephone switchboard workers), and new forms of crime (wire fraud).
- Governments quickly recognized the strategic importance of communication infrastructure—controlling telegraph lines became as important as controlling roads and ports.
- The dream of “annihilating distance” inspired utopian hopes that faster communication would promote peace, understanding, and global unity.

## The First “World Wide Web”

By 1900, undersea telegraph cables connected every continent except Antarctica. Victorian commentators called this network the “nervous system of the world”—a metaphor strikingly similar to how we describe the internet today.

# The Rise of Mass Education and Cheap Newspapers

- Throughout the 19th century, European and American governments introduced **compulsory education**, creating the first mass literate populations in human history.
- Literacy rates in Western Europe rose from roughly 50% in 1800 to over 90% by 1900, transforming who could participate in public discourse.
- The **penny press** (newspapers sold for one cent) emerged in the 1830s, replacing expensive papers aimed at elites with cheap dailies covering crime, scandal, and human interest stories.
- Mass literacy created a new kind of public: millions of readers who could be informed, persuaded, entertained—or manipulated—through print.

Country	Literacy c. 1800	Literacy c. 1900
England	~55%	~97%
France	~40%	~95%
Germany	~60%	~99%
United States	~75%	~90%

# John Stuart Mill: The Marketplace of Ideas

- John Stuart Mill (1806–1873) was an English philosopher whose essay *On Liberty* (1859) became the most influential defense of free speech in the Western tradition.
- Mill argued that society should allow the free expression of all opinions, even false or offensive ones, because open debate is the best method for discovering truth.
- His key insight: if an opinion is true, silencing it robs humanity of truth; if it is false, refuting it strengthens our understanding of why the truth is true.
- Mill believed that “the collision of adverse opinions” would gradually lead society toward progress, enlightenment, and human flourishing.

John Stuart Mill, *On Liberty* (1859)

“If all mankind minus one, were of one opinion, and only one person were of the contrary opinion, mankind would be no more justified in silencing that one person, than he, if he had the power, would be justified in silencing mankind.”

# Mill's Liberal Optimism: More Speech, More Truth, More Progress

- Mill's vision was profoundly optimistic: he believed that over time, free debate would lead humanity toward greater truth, tolerance, and moral progress.
- He argued that even false opinions serve a purpose—they force defenders of truth to sharpen their arguments and avoid “dead dogma” (beliefs held without understanding).
- Mill trusted that ordinary people, given access to information and education, would generally make good decisions about what to believe and how to live.
- This **liberal optimism** shaped democratic theory: the best response to bad speech is more speech, not censorship.

## Mill's Three-Part Defense of Free Speech

- If the silenced opinion is **true**, we lose the chance to exchange error for truth.
- If the silenced opinion is **false**, we lose the chance to strengthen our understanding of the truth through debate.
- If the silenced opinion is **partly true**, we lose the portion of truth it contains.

# Karl Marx: Who Owns the Means of Communication?

- Karl Marx (1818–1883) was a German philosopher and economist who developed a powerful critique of capitalism and its effects on politics, culture, and ideas.
- Marx agreed with Mill that free expression was essential, calling it “the realization of human freedom” and arguing that “the absence of freedom of the press makes all other freedoms illusory.”
- However, Marx asked a question Mill largely ignored: *Who owns the printing presses, newspapers, and telegraph lines?* Who can afford to publish?
- Marx argued that formal freedom of speech means little if the **means of communication** are controlled by wealthy elites who shape what ideas reach the public.

## The Structural Question

Mill asked: “Should we allow people to speak?” Marx asked: “Who actually *can* speak—and who gets heard?”

## Marx's Challenge: "Free Press" Means Freedom for Those Who Own Presses

- Marx argued that in a capitalist society, the class that controls **material production** (factories, land, capital) also controls **mental production** (newspapers, books, ideas).
- The “marketplace of ideas” is not a level playing field: some voices are amplified by wealth and institutional power, while others are marginalized or silenced by poverty.
- Marx did not oppose free speech—he was a crusading journalist who clashed repeatedly with government censors—but he insisted that ownership shapes content.
- This critique remains relevant: today, a handful of corporations control most newspapers, television networks, and social media platforms.

Karl Marx & Friedrich Engels, *The German Ideology* (1846)

“The ideas of the ruling class are in every epoch the ruling ideas... The class which has the means of material production at its disposal, has control at the same time over the means of mental production.”

# World War I: The End of the Long Nineteenth Century

- World War I (1914–1918) shattered the optimism of the “long nineteenth century”—the hope that technologies like the telegraph and telephone would bring understanding, peace, and progress.
- Instead, these same technologies enabled unprecedented coordination of industrial warfare: generals commanded armies across continents in real time, killing approximately 20 million people.
- Governments created the first modern **propaganda agencies**, using mass newspapers, posters, and film to demonize enemies and suppress dissent—proving that faster communication does not guarantee wiser decisions.
- The interception and decryption of the **Zimmermann Telegram** (1917) demonstrated that control over information could change history, bringing the United States into the war.
- Mill’s faith in the “marketplace of ideas” and the Victorians’ dream of technology-driven peace lay buried in the trenches of the Somme and Verdun.

## The Lesson

The same technologies that promised to connect humanity and promote peace became tools of propaganda, manipulation, and mass death. Information technology amplifies human choices—both noble and terrible.

# Discussion: What Does the Nineteenth Century Teach Us?

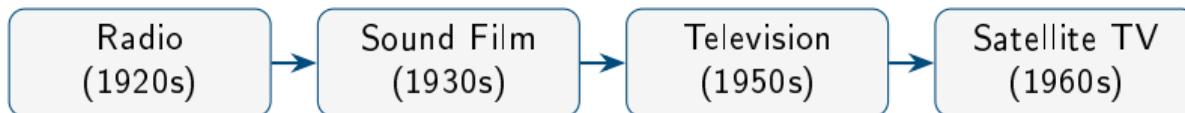
- Mill believed free and open debate would lead toward truth and progress; Marx warned that those who own the means of communication shape what ideas get heard.
- New technologies (telegraph, telephone, mass newspapers) promised to connect humanity and spread enlightenment—but also enabled unprecedented propaganda and mass warfare.
- The “marketplace of ideas” metaphor assumes a level playing field; in reality, access to communication has always been shaped by wealth, power, and institutional control.
- World War I revealed that faster communication does not guarantee wiser decisions—and that information can be weaponized against democratic deliberation.

## Discussion Questions

- ① Is the internet more like Mill's marketplace of ideas or Marx's analysis of media ownership? Can it be both?
- ② What modern examples show information technology being used for propaganda? How can citizens protect themselves?
- ③ If faster communication doesn't guarantee better decisions, what else is needed for democratic deliberation to work?

# The Fourth Revolution: Radio, Film, and Television

- The 20th century introduced **broadcast media**: technologies that allowed a single source to reach millions of people simultaneously with sound and moving images.
- **Radio** (1920s) brought news, entertainment, and political speeches directly into homes; **film** created a new form of mass storytelling and propaganda.
- **Television** (1950s) combined the immediacy of radio with the visual power of film, becoming the dominant medium for news, politics, and culture by the 1960s.
- These technologies created **one-to-many communication** on an unprecedented scale: a handful of broadcasters could shape what entire nations saw, heard, and believed.



# WWII Mass Media: The Battle for Hearts and Minds

- World War II (1939–1945) was the first war fought as much through radio waves as through bullets—both sides recognized that controlling information meant controlling morale.
- **Nazi Germany:** Propaganda Minister Joseph Goebbels declared radio “the eighth great power” and claimed the Nazi revolution “would have been impossible without the radio.”
- **United States:** President Franklin D. Roosevelt used his “Fireside Chats” (1933–1944) to speak directly to citizens, bypassing newspapers and calming fears during the Depression and war.
- **Britain:** The BBC broadcast resistance messages to occupied Europe; listening to foreign broadcasts was punishable by death in Nazi Germany.

## The Same Technology, Different Purposes

Radio could unite a nation against tyranny (FDR, BBC) or indoctrinate a population into supporting genocide (Goebbels). The technology itself was neutral—its effects depended on who controlled it and for what purposes.

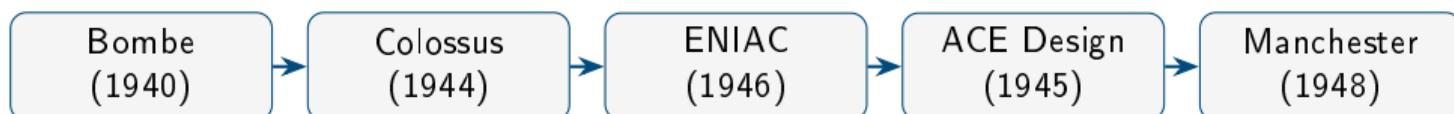
# Radio for Democracy and Dictatorship

- **The Volksempfänger** (“People’s Receiver”): Goebbels commissioned cheap radios (76 Reichsmarks, payable in installments) so every German home could receive Nazi broadcasts.
- By 1939, over 70% of German households owned radios—deliberately limited in range to prevent listening to foreign stations like the BBC.
- **FDR’s Fireside Chats**: Roosevelt’s 31 radio addresses reached up to 60 million listeners, using conversational language to explain complex policies and restore confidence.
- Both leaders understood that radio’s intimacy—a voice speaking directly into your living room—created an emotional bond impossible through print.

	Nazi Germany	United States
Goal	Indoctrination	Informed citizenship
Style	Rallies, spectacle	Conversational, intimate
Foreign broadcasts	Banned (death penalty)	Allowed
Outcome	Complicity in atrocity	Democratic mobilization

# The Birth of the Computer: Codebreaking and War

- The first electronic digital computers were born not from peacetime research but from the urgent need to break enemy codes during World War II.
- **Bletchley Park:** A secret British facility where mathematicians, linguists, and engineers—75% of them women—worked to crack Nazi communications.
- **Colossus (1944):** The world's first programmable digital electronic computer, designed by engineer Tommy Flowers to break the German Lorenz cipher used by Hitler's high command.
- **ENIAC (1946):** The American Electronic Numerical Integrator and Computer, originally designed to calculate artillery firing tables, became operational after the war ended.



# Alan Turing and the Foundations of Computing

- Alan Turing (1912–1954) was a British mathematician whose 1936 paper “On Computable Numbers” described a theoretical “universal machine” that could compute anything computable—the conceptual foundation of all modern computers.
- At Bletchley Park, Turing designed the **Bombe**, an electromechanical machine that cracked the German Enigma cipher, and contributed key insights to breaking the Lorenz cipher.
- After the war, Turing designed the **Automatic Computing Engine (ACE)**, one of the first designs for a stored-program computer—inspired by his wartime experience with Colossus.
- Tragically, Turing was prosecuted for homosexuality in 1952, chemically castrated, and died in 1954. The British government apologized in 2009; he was posthumously pardoned in 2013.

## From Codebreaking to Computing

The connection between wartime codebreaking and peacetime computing was direct: many pioneers of digital computers—Turing, Newman, Flowers—came from Bletchley Park. Information technology was born, in part, from the need to process enemy secrets faster than humans could.

# Claude Shannon: A Mathematical Definition of Information

- **Claude Shannon** (1916–2001) was an American mathematician and engineer whose 1948 paper “A Mathematical Theory of Communication” founded the field of **information theory**.
- Shannon defined **information** mathematically as the reduction of uncertainty—the more surprising a message, the more information it carries.
- He introduced the **bit** (binary digit) as the fundamental unit of information and showed how to calculate the minimum bits needed to transmit any message.
- Crucially, Shannon’s definition separates information from *meaning*: his theory measures how much data is transmitted, not whether it is true, important, or valuable.

## The Semantic Gap

Shannon explicitly bracketed questions of meaning: “The semantic aspects of communication are irrelevant to the engineering problem.” His theory enables the internet, but cannot tell us whether what we communicate is wise, true, or good.

# Hannah Arendt: Mass Media and Totalitarianism

- **Hannah Arendt** (1906–1975) was a German-American political philosopher who fled Nazi Germany and later wrote *The Origins of Totalitarianism* (1951).
- Arendt analyzed how radio, film, and print propaganda enabled the rise of Nazism and Stalinism by creating **mass societies** of isolated individuals hungry for belonging.
- She observed that totalitarian propaganda works not by making people believe lies, but by creating **cynicism**—a world where people believe “everything and nothing.”
- The “ideal subject” of totalitarian rule is someone for whom the distinction between **fact and fiction** no longer exists—making them easy to manipulate.

## Arendt on “Mass Society”

Arendt argued that modern technology and urbanization created “mass societies” of atomized individuals—lonely, disconnected from community, and desperate for meaning. Totalitarian movements offered belonging, purpose, and a coherent story about the world—even if that story was built on lies.

# Arendt's Warning: When Facts No Longer Matter

- Arendt observed that constant lying by propaganda does not make people believe the lies—instead, it destroys their capacity to distinguish truth from falsehood.
- When proven wrong, followers don't abandon leaders; they “take refuge in cynicism” and admire their leaders’ “superior tactical cleverness.”
- The goal of totalitarian propaganda is not persuasion but **organization**—creating a movement where loyalty to the leader replaces independent thought.
- Arendt’s analysis helps explain why simply “fact-checking” propaganda often fails to change minds.

## Arendt on the “Ideal Subject”

“The ideal subject of totalitarian rule is not the convinced Nazi or the convinced Communist, but people for whom the distinction between fact and fiction (i.e., the reality of experience) and the distinction between true and false (i.e., the standards of thought) no longer exist.”

—Hannah Arendt, *The Origins of Totalitarianism* (1951)

# Neil Postman: Amusing Ourselves to Death

- Neil Postman (1931–2003) was an American media theorist whose 1985 book *Amusing Ourselves to Death* critiqued the effects of television on public discourse.
- Postman contrasted two dystopian visions: George Orwell's *1984* (control through pain and censorship) vs. Aldous Huxley's *Brave New World* (control through pleasure and distraction).
- He argued that television transforms all content—news, politics, religion, education—into **entertainment**, making serious discourse impossible.
- Postman's central thesis: we are not being oppressed by tyrants, but are voluntarily “amusing ourselves to death” through passive consumption of trivial content.

## Two Dystopias

**Orwell's Fear:** An external tyrant bans books, controls information, and rules through fear.

**Huxley's Fear:** No tyrant is needed—people willingly surrender autonomy because they are too distracted and entertained to care about truth.

## Postman's Challenge: What If Huxley Was Right?

- Postman argued that by 1985, Huxley's vision was proving more accurate than Orwell's: no government needed to censor us because we had stopped wanting to read.
- Television created a culture where "the truth would be drowned in a sea of irrelevance"—not hidden, but buried under endless entertainment.
- The medium itself shapes the message: TV favors images over arguments, emotion over logic, and entertainment over substance—regardless of content.
- Postman's analysis anticipated concerns about social media: infinite distraction, shortened attention spans, and the transformation of citizenship into spectatorship.

*"What Orwell feared were those who would ban books. What Huxley feared was that there would be no reason to ban a book, for there would be no one who wanted to read one. . . . Orwell feared that what we fear will ruin us. Huxley feared that what we desire will ruin us."*

—Neil Postman, *Amusing Ourselves to Death* (1985)

# Discussion: What Does the Analog Era Teach Us?

- Shannon showed us how to measure and transmit information with mathematical precision—but his theory deliberately ignores questions of meaning, truth, and value.
- Arendt warned that broadcast media could enable totalitarianism by creating cynical, atomized masses who believe “everything and nothing.”
- Postman argued that television transforms all content into entertainment, making us passive consumers rather than active citizens.
- Both Arendt and Postman suggest that the *medium itself*—not just the content—shapes how we think and relate to each other.

## Discussion Questions

- ① Are social media platforms more like Orwell’s dystopia (surveillance, censorship) or Huxley’s (distraction, entertainment)? Could they be both?
- ② Does the “semantic gap” in Shannon’s theory matter? Can we build ethical communication systems without addressing meaning?
- ③ How would Arendt analyze the spread of misinformation on social media? What would she say about “post-truth” politics?

# The Fifth Revolution: Web 1.0

- In 1989, British scientist **Tim Berners-Lee** proposed the **World Wide Web** while working at CERN, the European particle physics laboratory in Switzerland.
- Unlike previous revolutions where new technology was owned by elites (presses, broadcast licenses), the web was designed to be **open and decentralized**.
- By 1993, CERN released the web's underlying code as **royalty-free open source**, allowing anyone to create websites and browsers without permission or payment.
- **Web 1.0** (roughly 1990–2005) was characterized by static websites, limited interactivity, and the separation of “content creators” from “consumers.”



# Tim Berners-Lee: The Open Web Vision

- Berners-Lee's key insight was combining **hypertext** (documents with clickable links) with the existing **internet** infrastructure to create a global information system.
- He invented the core technologies we still use today: **HTML** (the language of web pages), **HTTP** (the protocol for transmitting them), and **URLs** (the addressing system).
- Crucially, Berners-Lee chose to make the web **open and free**—anyone could create content, link to other content, and build new tools without asking permission.
- He later reflected: “Had the technology been proprietary, and in my total control, it would probably not have taken off. You can't propose that something be a universal space and at the same time keep control of it.”

## A Democratic Vision

Berners-Lee envisioned the web as a tool for human connection and knowledge-sharing—a “universal space” where information could flow freely. Unlike broadcast media (one-to-many), the web could enable many-to-many communication, potentially democratizing access to information.

# Hubert Dreyfus: What the Internet Cannot Do

- Hubert Dreyfus (1929–2017) was an American philosopher at UC Berkeley who applied **phenomenology**—the study of lived experience—to critique artificial intelligence and the internet.
- In his 2001 book *On the Internet*, Dreyfus argued that the web cannot replace **embodied, face-to-face interaction** essential for learning, trust, and meaning.
- Drawing on philosophers like Heidegger and Merleau-Ponty, he argued that our bodies, physical presence, and shared vulnerability are essential to how we understand the world.
- Dreyfus warned that the internet's anonymity and “risk-free” nature could undermine **genuine commitment**—the kind of risky, unconditional choices that give life meaning.

## The Problem of Disembodiment

Dreyfus argued that without bodily presence, we lose: the ability to read emotional cues; the vulnerability that creates trust; the shared physical context that grounds meaning; and the risk that makes commitment genuine. Online learning, he suggested, could never fully replace apprenticeship.

# The Promise and Peril of Web 1.0

- Web 1.0 embodied both the optimism of Mill (free exchange of ideas) and the concerns of Marx (who controls the infrastructure?).
- **Promises:** Global access to information; democratized publishing; new forms of community and commerce; reduced barriers to knowledge.
- **Perils:** Digital divide between connected and unconnected; early concerns about privacy, piracy, and the reliability of online information.
- By 2000, the dot-com crash revealed that enthusiasm had outpaced sustainable business models—but the web's fundamental infrastructure remained.

Web 1.0 Promise	Emerging Concern
Anyone can publish	Quality control, misinformation
Global access to information	Digital divide, unequal access
Decentralized, open system	Corporations gaining control
Anonymous communication	Loss of accountability, trust

# Discussion: What Did We Learn from Web 1.0?

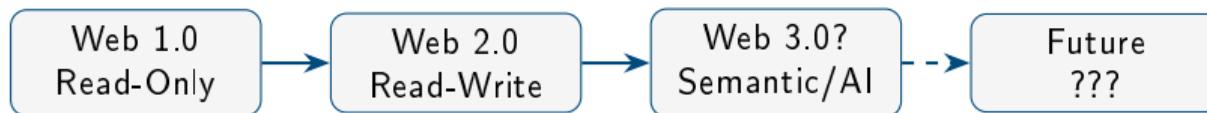
- Web 1.0 showed that technology is not neutral: design choices (open standards, hyperlinks, anonymity) shape social outcomes.
- Berners-Lee's decision to make the web open and free enabled explosive growth—but also meant he could not control how it was used.
- Dreyfus's critique anticipated concerns about “screen time,” online education’s limitations, and the difference between information and wisdom.
- The tension between openness and control, access and quality, connection and isolation would intensify in Web 2.0.

## Discussion Questions

- ① Was Berners-Lee right to make the web open and free? What are the trade-offs?
- ② Do you agree with Dreyfus that online interaction lacks something essential that face-to-face interaction provides?
- ③ Looking at the history of IT revolutions, what patterns do you see? Does new technology tend to fulfill its promises or create new problems?

# Looking Ahead: Web 2.0 and Beyond

- **Web 2.0** (roughly 2005–present) transformed users from passive consumers to active content creators through social media, blogs, wikis, and user-generated content.
- Platforms like Facebook, YouTube, Twitter, and Wikipedia enabled unprecedented global participation—but also raised new ethical questions about privacy, attention, and power.
- Every historical IT revolution promised liberation but also enabled new forms of control; Web 2.0 is no exception.
- The thinkers we have studied—Plato, Mill, Marx, Arendt, Postman, Dreyfus—offer frameworks for analyzing these ongoing challenges.



# What IT Was Used in Making This Course?

- The tools used to make and record these lectures provide a practical example of the history we've discussed.
- I've used:
  - Written English (the first IT revolution).
  - LaTeX (a typesetting system developed in the 1980s, building on decades of digital typography).
  - A digital video camera and microphone (tools for capturing audiovisual information).
  - VSCode (a modern code editor) to write and compile the LaTeX source files.
  - I used generative AI (CoPilot, Claude, Gemini) to help me write LaTeX code, generate graphics, proofread, and format the slides.
  - A laptop computer to run all these tools and connect to the internet.
  - I used GitHub to version-control the source files and collaborate with others.
  - This is delivered in Web 2.0 teaching platforms (D2L, YouTube, Perusall) that allow for interaction, comments, and updates.
- Each of these tools has a history and ethical implications we could analyze using the frameworks we've discussed.

# Conclusion: Five Revolutions, Recurring Questions

- Each IT revolution—writing, printing, telegraph/telephone, broadcast media, and the web—promised to democratize knowledge and connect humanity.
- Each also raised concerns about memory (Plato), propaganda (Luther's pamphlets, WWI), ownership (Marx), passivity (Postman), and embodiment (Dreyfus).
- The ethical questions recur because technology amplifies human choices: it can spread enlightenment or lies, connect or isolate, liberate or control.
- Understanding this history helps us ask better questions about AI, social media, and whatever comes next.

## Key Takeaway

Technology is never neutral. The design of information systems—who controls them, what they measure, how they shape attention—reflects and reinforces values. Studying the history of IT ethics helps us become more thoughtful creators and users of the technologies that shape our lives.

*“Those who cannot remember the past are condemned to repeat it.” — George Santayana*