



# To Thine Own Mind Be True: Understanding Cultural Technologies, From Cave Walls to ChatGPT

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Accepted: 28 October 2024  
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**Keywords** Creativity · Technology · Education · Research · Generative artificial intelligence · Future · Learning · Cultural technologies · AI

*Our conventional response to all media, namely that it is how they are used that counts, is the numb stance of the technological idiot. — Marshall McLuhan*

*The only questions that really matter are the ones you ask yourself—Ursula LeGuin*

In this article series, we explore a range of topics related to technology, learning, and creativity. Our recent focus has been on the evolving landscape of generative AI (GenAI) and its impact on creativity and education. In recent columns, we have spoken with renowned scholars (Henriksen et al., 2023; Richardson et al., 2023; Warr et al., 2023; Woo et al., 2023), conducted practitioner focus groups (Dunnigan et al., 2023), and analyzed social media posts devoted to AI and education (Oster et al., 2024), as well as covered broader thought pieces around these issues (Mishra et al., 2024).

This article explores how media technologies have historically shaped human cognition and society, offering insights into the transformative role of generative AI on creativity, education, and communication today. Our analysis, an extension of the theoretical works of Marshall McLuhan (1964), Neil Postman (1985a, 1985b, 1998), and Walter Ong (1982), suggests the need to examine how the medium itself shapes thinking and behavior, beyond its specific content.

AI is just the latest of many technological changes that have happened over time—from the wheel to self-driving cars; from the printing-press to the internet—each having its

own unique impact on humans and the socio-material world we inhabit (McNeil, 2002). The rapid diffusion of GenAI technologies, gaining millions of users almost immediately upon emergence (Bick et al., 2024), marks another pivotal moment in this evolution. These new tools are challenging our conceptions of communication, creativity, and learning in ways we have yet to fully grasp (Mishra et al., 2023).

These cultural technologies, which we will explore in greater detail, are not mere tools but complex systems to be “read” and “interpreted.” This necessity has given rise to various forms of literacy (Murray, 2000)—digital literacy, numerical literacy, AI literacy, media literacy, and more. Traditionally, these literacies have focused on critical content analysis (DeJulio et al., 2020) of a given medium and how it functions.

However, we argue for a reimagining of media literacy. We propose an approach that encompasses both a knowledge of media as well as a deeper understanding of our own psychology and the biases that shape us and our interactions with media. In an age where the lines between human and artificial intelligence are increasingly blurred, self-awareness is critical. By developing this enhanced, human-centered form of media literacy, we can give ourselves agency to creatively and critically engage with new technologies and their outputs.

As GenAI becomes part of our work and personal lives, it is often difficult to judge the impact of nascent technologies and separate truth from hype, especially when their effects must emerge over time. Yet, it is only by cultivating a more nuanced understanding—informed by historical knowledge and with sensitivity to the possibilities and demands of new technologies—that we can navigate these challenges and opportunities. To fully grasp the transformative potential of AI, we must first look back at the history of media technologies to contextualize and better understand how they have shaped human cognition and society over time.

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## Understanding Cultural Technologies

Throughout human history, certain technologies have played a pivotal role in shaping our physical, cognitive, and social landscapes. Cultural technologies—tools, systems, and practices that shape how humans create, communicate, store, and transmit information—profoundly impact cognition and society (Yiu et al., 2023).

Cultural technologies range from fundamental innovations like language and writing to complex systems like the internet and artificial intelligence. What sets them apart is their influence on communication, knowledge preservation, social organization, creative expression, and cognitive processes. Not all technologies qualify as cultural technologies. A hammer, for instance, while useful, does not fundamentally alter how we think or communicate. In contrast, writing allowed for knowledge preservation across generations, while the printing press democratized access to information, catalyzing movements like the Renaissance and the Reformation (McNeil, 2002).

Yet, the line between cultural technologies and other technologies can be fluid. Technologies not initially designed as cultural technologies can evolve to have significant cultural impacts over time. For instance, the car, initially a transportation tool, profoundly shaped urban planning and social interactions, becoming a cultural symbol.

Cultural technologies have a multifaceted impact on society. In education, they shape how knowledge is transmitted and acquired. In politics, they influence how ideas are communicated and movements are organized. Economically, they affect modes of production, trade, and economic organization. In the realms of art and entertainment, they provide new mediums for creative expression and consumption. Moreover, they alter how people form and maintain social relationships. The internet and social media, for example, have transformed how we connect, share information, and form communities (Allen, 2019).

The impact of cultural technologies is often bidirectional: they shape culture while simultaneously being products of it, reflecting societal values, needs, and priorities. That said, to truly grasp the profound influence of cultural technologies, we must understand that they are not merely neutral conduits for information. McLuhan's famous phrase, "the medium is the message" (2017, p., 1), highlights how technologies subtly yet profoundly shape human thought.

McLuhan's insight contrasts with the prevailing "content is king" mentality. While the specific information conveyed is important, it's the underlying structure and characteristics of the cultural technology that have the most far-reaching effects on our minds and society.

Consider the difference between reading a novel and watching its film adaptation. While the content may be

similar, the experience and cognitive processes involved differ fundamentally. Reading engages our imagination, allowing us to construct mental images and pace the narrative ourselves, while film provides a predetermined visual and auditory experience, directly engaging our senses but leaving less room for personal interpretation.

Cultural technologies also shape the social context of our interactions with information and entertainment. Reading is traditionally solitary, allowing for deep, individual engagement. Watching a movie in a theater is inherently social, with shared reactions and emotions. Television introduced an interesting dynamic: while often viewed alone or in small groups, innovations like the laugh track attempted to simulate a shared social experience.

This concept of cultural technologies as influential forces can be understood through the lens of prefigurative schemas (Mishra et al., 1996; Spiro et al., 1996)—implicit cognitive biases inherent in a medium that shape how we process information. Different technologies create distinct prefigurative schemas that influence our thinking in subtle yet profound ways. For instance, the linear nature of written text may foster logical, structured thinking, while the internet's hypertextual nature might encourage more associative and nonlinear thought processes. The idea is not that specific technologies force a particular form of cognition over another but rather that they are more amenable to certain forms of cognition and knowledge building.

The challenge in recognizing the influence of cultural technologies lies in their ubiquity. Like fish unaware of water, we are often oblivious to the technological environment that surrounds us, making it difficult to critically examine how these technologies shape our perceptions and behaviors. As we explore the history of cultural technologies, we must remember this concept of prefigurative schemas to consider how different communication technologies have molded human cognition and society throughout the ages. To illustrate how these cultural technologies have shaped human cognition and society, we will now explore key examples from oral traditions to the rise of generative AI.

## A Historical Journey Through Cultural Technologies

The evolution of cultural technologies has profoundly shaped human cognition, society, and culture throughout history. To illustrate this journey, we'll explore key cultural technologies chronologically, supplemented by a concise overview table that outlines their characteristics and impacts Table 1.

This table provides a snapshot of how different cultural technologies have influenced human interaction, knowledge dissemination, and broader societal structures. We now explore each in turn:

**Table 1** Cultural technologies and their effects

Cultural Technology	Characteristics & Impact on Human Interaction/ Psychology	Impact on Knowledge and Information	Impact on Broader Human Culture, Politics, & Society	Unexpected Side Effects on Broader Society	References
Oral	<ul style="list-style-type: none"> <li>– High value on memory, improvisation, and rhetorical skills</li> <li>– Builds deep, personal connections through face-to-face interactions</li> <li>– Communication style is often metaphorical and nonlinear</li> </ul>	<ul style="list-style-type: none"> <li>– Knowledge is transient and personalized, heavily dependent on individual memory and oral traditions</li> <li>– Truth and understanding are communal and often shaped through collective storytelling</li> </ul>	<ul style="list-style-type: none"> <li>– Oral traditions form the backbone of cultural identity and heritage</li> <li>– Leadership and social structures often revolve around those skilled in oration</li> <li>– Preservation of folklore and cultural myths, influencing generations</li> </ul>	<ul style="list-style-type: none"> <li>– Potentially led to the homogenization of local languages in larger tribal or social groups</li> </ul>	<ul style="list-style-type: none"> <li>– Ong (1982), Finnegan (2003), Lord et al. (2000)</li> </ul>
Print	<ul style="list-style-type: none"> <li>– Encourages analytical and sequential thinking</li> <li>– Fosters individual interpretation and exploration of ideas</li> <li>– Enhances focus and deep reading abilities</li> </ul>	<ul style="list-style-type: none"> <li>– Knowledge becomes fixed and searchable in texts, leading to a more permanent and objective form of truth</li> <li>– Allows for wide dissemination and preservation of knowledge</li> </ul>	<ul style="list-style-type: none"> <li>– Promotes literacy and self-education</li> <li>– Democratizes access to knowledge, contributing to social and political reforms</li> </ul>	<ul style="list-style-type: none"> <li>– Contributed to deforestation due to paper production</li> </ul>	<ul style="list-style-type: none"> <li>– Eisenstein (2005), McLuhan (2011), Febvre and Henri-Jean (1997)</li> </ul>
Radio	<ul style="list-style-type: none"> <li>– Creates a sense of belonging through shared auditory experiences</li> <li>– Enhances imaginative capabilities and auditory focus</li> <li>– Often delivers content in a conversational, engaging manner</li> </ul>	<ul style="list-style-type: none"> <li>– Information is presented in a linear, time-bound manner, often ephemeral</li> <li>– Knowledge transfer is wide-reaching but lacks the permanence of written records</li> </ul>	<ul style="list-style-type: none"> <li>– Unifies listeners across vast geographies, creating a sense of national identity</li> <li>– Influential in political and social mobilization during key historical events</li> </ul>	<ul style="list-style-type: none"> <li>– Influenced the music industry by creating a platform for mass dissemination of music</li> </ul>	<ul style="list-style-type: none"> <li>– Douglas (2013), Hendy (2013), Scannell (1996)</li> </ul>
Cinema/Film	<ul style="list-style-type: none"> <li>– Offers immersive visual storytelling and emotional engagement</li> <li>– Influences empathy and social perspective-taking</li> <li>– Can shape collective memories and historical narratives</li> </ul>	<ul style="list-style-type: none"> <li>– Serves as a cultural artifact preserving historical and social contexts</li> <li>– Provides a visual form of knowledge that can be more accessible than text</li> </ul>	<ul style="list-style-type: none"> <li>– Shapes and reflects cultural norms, values, and ideologies</li> <li>– Has the power to influence and change societal attitudes and behaviors</li> <li>– Often used as a tool for propaganda and political messaging</li> </ul>	<ul style="list-style-type: none"> <li>– Contributed to the globalization of cultures and the spread of “Hollywood” values</li> <li>– Has had economic impacts, such as the rise of the blockbuster and the commercialization of entertainment</li> </ul>	<ul style="list-style-type: none"> <li>– Bazin (2004), Gunning (1994), Cook (2016)</li> </ul>
Television	<ul style="list-style-type: none"> <li>– Offers a combination of visual and auditory stimulation</li> <li>– Encourages passive content consumption</li> <li>– Often presents simplified narratives and soundbites</li> </ul>	<ul style="list-style-type: none"> <li>– Information is quickly consumed and often lacks depth, promoting a more surface-level understanding</li> <li>– Knowledge is influenced by visual representations and is subject to editorial bias</li> </ul>	<ul style="list-style-type: none"> <li>– Has a profound impact on social norms, fashion, and language</li> <li>– Redefines family entertainment and leisure activities</li> </ul>	<ul style="list-style-type: none"> <li>– Altered sleep patterns and lifestyle habits, potentially impacting health</li> </ul>	<ul style="list-style-type: none"> <li>– Postman (1985a), Williams (2004), Spigel (1992)</li> </ul>

Table 1 (continued)

Cultural Technology	Characteristics & Impact on Human Interaction/ Psychology	Impact on Knowledge and Information	Impact on Broader Human Culture, Politics, & Society	Unexpected Side Effects on Broader Society	References
Internet/ Social Media	<ul style="list-style-type: none"> <li>Facilitates rapid, interactive communication</li> <li>Encourages short attention spans and information overload</li> <li>Personalizes user experience through algorithms</li> </ul>	<ul style="list-style-type: none"> <li>Vast and instantaneous access to information, but often with issues of credibility and verification</li> <li>Knowledge becomes decentralized and user-generated</li> </ul>	<ul style="list-style-type: none"> <li>Revolutionizes every aspect of society from commerce to social interactions</li> <li>Enables global connectivity and mobilization for social and political causes</li> </ul>	<ul style="list-style-type: none"> <li>Influences mental health, with increases in issues like anxiety and depression linked to social media use</li> <li>Redefines the concept of privacy and personal data usage</li> </ul>	Carr (2010), Shirky (2008), Turkle (2012)
Generative AI	<ul style="list-style-type: none"> <li>Customizes content creation and information processing</li> <li>Challenges traditional notions of authorship and creativity</li> </ul>	<ul style="list-style-type: none"> <li>Knowledge creation and dissemination become more automated and personalized</li> <li>Raises questions about the authenticity and origin of information</li> </ul>	<ul style="list-style-type: none"> <li>Influences artistic, educational, and professional landscapes</li> <li>Could significantly impact job markets, creativity, and the nature of human-machine collaboration</li> </ul>	<ul style="list-style-type: none"> <li>Raises societal and ethical debates about the role and limits of AI in knowledge and culture creation</li> <li>May lead to unforeseen changes in employment structures and skill demands</li> </ul>	Boström (2014), Russell & Norvig (2016), Kaplan (2015)

## The Oral Tradition: Our First Cultural Technology

Language, our original cultural technology, laid the foundation for human civilization. In oral cultures, memory and rhetorical skills were paramount, as knowledge existed primarily in the minds of individuals. This oral-based society fostered strong social bonds and hierarchies built on oratory skills. Knowledge was fluid and adaptable, allowing for dynamic cultural evolution but also risking the loss of historical accuracy. The dominance of oral traditions led to the development of rich linguistic expressions and intricate storytelling techniques that continue to influence our cultural expressions today.

## The Written Word: Externalizing Knowledge

The invention of writing marked a revolutionary shift in human communication and cognition. For the first time, knowledge could be externalized and preserved across time and space. This transition encouraged more analytical thinking and fostered a sense of objectivity. The subsequent invention of the printing press further amplified these effects, democratizing access to information and catalyzing major societal shifts such as the Renaissance, the Reformation, and the Scientific Revolution.

The profound impact of cultural technologies on human cognition is well illustrated by the effects of print media, as described by Latour (1990) and elaborated on by Mishra et al. (1996):

Most of the significant effects of the invention and spread of print can be traced to certain specific properties of print media: In particular, print created objects that were mobile, immutable, presentable, and readable... These properties ensured that discussions could be carried beyond the conversational arena, that ideas could be transported without change in their essential nature... The crucial argument here is that initially it was the medium...that was immutable. Then the idea of immutability passed on from the medium to the message, with attendant implications of accuracy, fixedness, and truthfulness (Latour, 1990, p. 289).

These properties of print ensured that ideas could be transported across time and space without altering their essential nature, introducing a new concept of immutability in knowledge transmission. This immutability has far-reaching consequences for how we perceive and value ideas. The notion of intellectual property emerged, manifesting most clearly in academic practices like citation or measuring scholarly impact through reference counts. The concept of copyright, too, is a direct outgrowth of print's ability to fix ideas in a permanent, reproducible form. Plagiarism became equivalent to intellectual theft, a serious ethical breach in

academic and creative circles. Thus, the attributes of print changed how knowledge was disseminated and fundamentally altered our valuation of idea ownership and original thought.

### **Electronic Cultural Technologies: The Age of Broadcast**

The twentieth century saw the rise of electronic cultural technologies, particularly radio and television, which again transformed the landscape of human communication. These technologies introduced new dimensions to mass communication, combining audio and visual elements to create experiences designed to captivate an audience. They also allowed for real-time mass communication, unifying audiences across geographic boundaries.

Both radio and television promoted passive consumption and simplified issues, creating shared global experiences at national and even global scales, shaping fashion, language, and social norms. However, they also raised concerns about propaganda and manipulation of public opinion.

Neil Postman, in his seminal work “Amusing Ourselves to Death” (1985), critiqued these cultural technologies for their profound effect on public discourse, particularly regarding politics and culture. He argued that television’s emphasis on visual appeal and brief, engaging content was transforming all public discourse into entertainment. Complex political issues, once the subject of lengthy debates and detailed written analyses, were reduced to sound bites and image-driven narratives. He wrote:

[It] is not that television is entertaining but that it has made entertainment itself the natural format for the representation of all experience. [...] The problem is not that television presents us with entertaining subject matter but that all subject matter is presented as entertaining.

This shift, Postman contended, was not merely a change in format but a fundamental alteration of the content itself. Political discourse became less about substantive policy discussions and more about performance, charisma, and entertaining spectacle. Thus, the line between politician and celebrity blurred, with political success increasingly tied to media savvy rather than governing ability. This transformation of politics into a form of entertainment, Postman warned, threatened the foundations of informed democratic participation, as citizens became passive consumers of political theater rather than active participants in substantive civic debate.

### **The Internet and Social Media: Decentralization and Interactivity**

The advent of the internet and the subsequent rise of social media marked another revolutionary shift in cultural technology. The decentralized and interactive nature of the

internet allowed for unprecedented levels of user participation and content creation, which fundamentally altered how we access information, communicate, and form social connections.

The vast information availability, combined with the ability of each of us to become creators of content, has fundamentally shifted how we seek and process knowledge. It fosters non-linear thinking and associative learning at a global scale—something not possible before. Social media platforms have transformed social interactions, allowing for instant global communication and online communities based on shared interests. While this has increased connectivity and democratized content creation, it has also raised concerns about privacy, the spread of misinformation, and possible impacts on mental health.

The rise of social media ushered in a new era of digital discourse that has reshaped our cultural and political landscape. Scholars like Sherry Turkle (1996) and Jaron Lanier (2014) highlighted how these platforms, designed to maximize user engagement, created an “attention economy” where sensationalism often outweighs factual accuracy. This environment led to the phenomenon of “echo chambers” and “filter bubbles,” where individuals are increasingly exposed only to information that confirms their existing beliefs. Moreover, the rapid spread of information accelerated the news cycle, often prioritizing speed over accuracy. This has challenged traditional gatekeepers of information, democratizing access but also blurring the lines between credible sources and unverified claims. Politically, social media has become a powerful tool for mobilization and direct communication, allowing for the recognition of individual creativity unchecked by traditional gatekeeping mechanisms. At the same time, it has also been weaponized for spreading disinformation and manipulating public opinion. The viral nature of social media has given rise to “meme politics,” reducing complex issues to shareable images and slogans. While this has increased political engagement for some, it has also been criticized for trivializing serious issues and eroding the quality of public discourse. The long-term implications of social media on democracy, social cohesion, and individual well-being remain a subject of intense debate.

### **The Dawn of Generative AI**

Entering the era of GenAI, we face new challenges and opportunities in how we create, disseminate, and consume information. While social media transformed communication by democratizing content creation, generative AI fundamentally redefines this process by autonomously creating entirely new content, challenging and redefining long-held notions of agency, authorship, and creativity. The full impact of GenAI on human cognition and society is yet to be understood, but it promises to be as transformative as



prior cultural technologies. Each prior shift in media not only altered how we communicate but how we think. Generative AI, however, brings a unique shift—its dynamic and adaptive nature changes not just the medium but the very role of the creator.

What sets GenAI apart is its unique combination of attributes (Mishra et al., 2023). It is *generative*, capable of producing vast amounts of novel content across multiple modalities. Its *interactive* nature allows for real-time, dialogic exchanges with users. Additionally, GenAI is *adaptive*, learning and modifying its outputs based on user interactions and new data. Its potential *ubiquity* means it could be accessible anytime, anywhere, through various devices. Finally, its *multimodal* capabilities enable it to generate content across different media formats, including text, image, video, and audio. This powerful confluence of features distinguishes GenAI as a transformative force in our cultural and technological landscape.

These characteristics challenge our traditional understanding of media. Unlike print, which introduced immutability to information, GenAI is inherently mutable, capable of producing different outputs for the same prompt. This mutability, combined with its interactivity, fundamentally alters our relationship with information and knowledge creation. Thus, while the printing press solidified information in a static form, generative AI introduces a new paradigm where information is not fixed but continually evolving based on inputs. This collaborative, constant flux challenges traditional notions of authorship and ownership, as the concept of a “final version” becomes elusive and also raises uncertainty about who the true author is.

Another profound impact of these systems stems not from their inherent capabilities but from how we, as humans, perceive and interact with them. Our innate tendency to anthropomorphize non-human entities creates a powerful illusion when we engage with GenAI. We instinctively attribute human-like qualities such as intentions, emotions, and moral standing to these systems, despite their lack of true sentience (Reeves & Nass, 1996; Salles et al., 2020).

This tendency is rooted in our evolutionary past. Our “Stone Age minds” evolved to quickly detect agency and infer intentions for survival (Kahneman, 2011) and can be “fooled” by technologies that trigger our social instincts (Harari, 2023). Just as beavers attempt to build dams over speakers playing the sound of running water (Debczak, 2015), our minds can be tricked into forming emotional connections with AI systems. Understanding the characteristics of generative AI reveals deeper uncertainties about its impact on human creativity, knowledge, and cognition. Thus, we explore some initial implications of this technology on our lives.

## Generative AI as a Cultural Technology: Tentative Implications

Our historical examination of cultural technologies illustrates how each new form of communication has left an indelible mark on society, based on how their affordances, constraints, opportunities, and risks intersect with human cognition. The persuasive power of anthropomorphized AI, coupled with its lack of true agency or ethical framework, creates a complex landscape of potential benefits and risks:

**Cognitive Augmentation vs. Offloading:** AI can process and synthesize vast amounts of information, potentially augmenting human knowledge and creativity. However, users may increasingly rely on AI for decision-making and opinion formation, potentially eroding critical thinking skills and individual agency (Li et al., 2023).

**Personalization vs. Echo Chambers:** The adaptive nature of GenAI could create highly personalized learning and information experiences. Conversely, it could also create feedback loops that reinforce existing beliefs and biases, narrowing perspectives rather than broadening them (Huschens et al., 2023).

**Innovation vs. Homogenization:** While capable of diverse outputs, AI systems ultimately learn from and reflect human-generated content. This could lead to new forms of expression and innovation, but also potentially stifle genuine creativity and cultural diversity (Mishra et al., 2023) by reflecting preexisting conceptions already embedded in training data.

**Information Access vs. Misinformation:** GenAI offers unprecedented access to information and knowledge creation. However, the ease with which it can produce convincing content also raises the specter of misinformation at an unprecedented scale, threatening social trust and our shared sense of reality (Deshpande et al., 2023).

As we interact more with AI-generated content, we must consider how it will shape our thought processes. Will our ability to discern between human and AI-generated content diminish over time? Could our reliance on AI for information and problem-solving fundamentally alter our own cognitive abilities?

In terms of creativity, GenAI is already being used in fields ranging from art and music to scientific research and product design. This collaboration between humans and artificial intelligence could lead to new forms of expression and innovation. However, it also raises questions about the future of human creativity, the value we place on purely human-generated works, and the potential disruption to traditional labor markets and creative processes (Harari, 2023).

## Navigating the New Landscape

Understanding media's nature goes far beyond analyzing its content. The medium itself, as McLuhan famously noted, is the message. And in an age of AI, that medium is becoming increasingly complex, interactive, personalized, and constantly evolving.

The key to navigating this new landscape lies not just in developing more advanced technologies or more stringent regulations, but in fostering a deeper understanding of ourselves. From cave walls to AI, each new technology has shaped our thinking. Recognizing this, and acknowledging our cognitive biases, helps us engage with new innovations.

In the end, the story of GenAI is not just about the capabilities of machines, but about the nature of human cognition and our adaptability in the face of technological change. As we continue to develop and interact with these powerful systems, our greatest challenge — and opportunity — lies in understanding and consciously shaping the evolving relationship between our minds and our creations. Marshall McLuhan's prescient words ring truer than ever:

The new media and technologies by which we amplify and extend ourselves constitute a huge collective surgery carried out on the social body with complete disregard for antiseptics.

This stark metaphor serves as a potent reminder of the profound and often unforeseen impacts that new cultural technologies can have on our collective psyche and social structures. And those changes will influence not just how but also what we, as educators, should pay attention to.

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