Exploring new pathways for science communication in AI era

By LIU YUWEI

Amid rapid advances in AI that are reshaping the information ecosystem, science communication is undergoing a profound paradigm shift. This shift extends beyond disseminating knowledge to encompass a deeper practice involving rebuilding trust, upholding ethical norms, advancing technology for social benefit, and fostering dialogue among civilizations. Confronted with multiple challenges—including eroding public trust, entrenched information cocoons, and growing difficulty in reaching global consensus—scholars are urgently rethinking how science can be communicated more effectively. Against this backdrop, *CSST* spoke with Ulrich Tiedau, a professor of European history at University College London (UCL), and Simon Mahony, an emeritus professor of digital humanities at UCL's Department of Information Studies and visiting professor at Peking University (PKU).

Crisis of public trust

No science can exert its value unless it is spread and shared. "In today's world we have rapid technological advancements and the rise of AI, but we also experience global crises such as climate change, public health challenges, and political unrest marked by the rise of far-right factions and extremist views. Of concern is also the spread of fake news by social media and auto-generated news content. In the West, there are questions about the extent to which we can trust media and even, in some cases, government institutions," Mahony noted. Under such conditions, science cannot fulfill its social role if it remains sealed within the ivory tower. Science does not exist in isolation. Its value depends on effective public communication—communication that is transparent, accessible, and grounded in ethical responsibility. Without these qualities, misinformation flourishes and fake news thrives, eroding public understanding and informed decision-making.

Tiedau offered a deeper historical reflection: The way knowledge is transmitted has always shaped its social impact, and the notion of "sci-

Ulrich Tiedau (left) and Simon Mahony (right) Photo: PROVIDED TO CSST

ence for social good" has never been neutral. "For instance, during the 19th century, scientific discourse was often used to justify imperial expansion, with 'progress' framed in terms that supported European dominance." This historical reminder underscores that science communication is never value-free. Today, with digital platforms and AI tools magnifying both reach and risk, the stakes are even higher. By pointing to distorted colonial histories online, the politicization of climate science, and the rise of historical revisionism, Tiedau argued that historians must go beyond merely providing facts and instead cultivate public awareness of how knowledge is constructed and circulated. This form of critical literacy—rooted in centuries of reflection on the transmission of ideas—is especially vital in an era marked by global entanglements and competing historical perspectives.

As digital technologies connect the world with unprecedented speed, intelligent media has also strengthened "information cocoons" and "echo chambers," warping the public's cognitive logic. Mahony vividly described this process: Users tend to interact within networks of people who share similar opinions, biases, and unconscious prejudices, creating self-reinforcing "echo chambers" that limit exposure to diverse perspectives. "The more we 'like' the more we get," he remarked. This self-reinforcing loop deepens social polarization—as users are increasingly targeted with politically biased material—and fuels scientific skepticism with anti-vaccine rhetoric and climate change denial. To respond, science communica-

tion must undergo a paradigm shift, moving from broad dissemination to context-sensitive engagement tailored to specific audiences. Communicators need to draw on narrative techniques, visualization, and interactive formats to embed evidence-based information within cultural, political, and cognitive contexts, thereby building trust.

Empowering audiences

How, then, can we assess the real impact of this paradigm shift? The "Decoding Climate Narratives: A Comparative Study of Climate Change Communication on Social Media Platforms in China and the UK," funded under the UCL-PKU Strategic Partner Funds 2024/25, offers an instructive example. By using multidimensional indicators—such as sentiment analysis and measures of online engagement—the research team aims to evaluate how communication affects public perception and trust in science, pushing the field toward greater measurability, reproducibility, and optimization.

Tiedau expanded on the idea of "breaking the cocoon" from the perspective of intellectual history. He drew parallels between today's information cocoons and the spread of pseudoscience, such as eugenics, in early 20th-century Western media, highlighting the deep historical roots of these phenomena. Empowering audiences, he argued, is essential. The combination of computational social science and digital humanities offers practical tools: "Digital textual analysis can help trace sentiment and misinformation across large-scale digitized archives such as newspapers, while network analysis maps how ideas, both scientific and

pseudo-scientific ones, spread through historical communication flows. These methods can reveal the roots of public trust and mistrust, offering deeper insight into today's media challenges and equipping audiences to navigate them critically."

Scientific narratives

In an age of information overload, storytelling retains its ability to "cut through the noise" and reach people directly. Mahony emphasized that narrative theory and rhetorical studies have long recognized storytelling as integral to effective science communication, giving structure, emotional resonance, and accessibility to complex concepts. "Stories enable audiences to connect abstract scientific concepts with their own lived experiences, making complex ideas more understandable." Yet he also warned that narrative techniques can easily be misused to spread misinformation and fake news. Academics are trained to seek evidence rooted in rigorous methodology and to critically evaluate the reliability of sources. In science communication, storytelling must therefore remain transparent, accessible to non-experts, and firmly grounded in reproducible, evidence-based research.

Tiedau raises narrative to the plane of civilizational understanding. Historians, he explained, craft coherent accounts from fragmented evidence, not unlike scientists who interpret intricate natural phenomena. Yet history repeatedly reminds us that narratives can both unite and mislead. To tell responsible public stories, he argued, communicators must rely on core humanistic methods such as contextualization, source criticism, and triangulation of perspectives.

AI lends a fresh dimension to this work. "Digital humanities adds computational methods to detect patterns, tropes, and exclusions across large corpora. 'Distant reading' can flag inconsistencies or biases," Tiedau observed. Building inclusive narratives requires actively incorporating diverse voices. When combined, these approaches foster science communication that is more critical, reflective, and equitable.

Interdisciplinary collaboration

Today's complex global challenges can no longer be addressed by any single discipline alone. Interdisciplinary collaboration—and the integration of the humanities with science and technology—are becoming crucial for enhancing public scientific literacy. Mahony stressed that the mode of communication is now as consequential as the information conveyed. Digital humanities, for instance, bridges computational techniques and cultural analysis, enabling scientific data to be presented in ways accessible to non-specialists. He also specifically highlighted the vital role of open education, championed by UNESCO, in enhancing the efficiency of science communication. A notable example is the UCL Press, which distributes all publications under open-access licenses, demonstrating how such practices significantly broaden public access to scientific knowledge.

At a time when the humanities face increasing marginalization in universities, Tiedau sees a historic opportunity to bridge the longstanding divide between conventional science and academic disciplines. The rise of digital humanities, he argued, is a powerful response to this moment, pointing to concrete examples of how this emerging field contributes uniquely to science communication. A digital-humanities project mapping a historical epidemic, for example, can enrich epidemiological data with public responses and policy, deepening health literacy.

Digital humanities also plays a crucial role in tracing the evolution of scientific ideas and digitizing archival materials that reveal the social settings in which discoveries occur. Viewed through a humanistic lens, computational social science can critically examine how scientific facts and public trust are socially constructed. Open-education initiatives can embed foundational humanities methods—source evaluation, historical reasoning, and ethical critique—into public science learning. This, Tiedau concluded, can help cultivate inclusive, reflective, and historically informed science communication.

From the standpoint of Latin America and the Caribbean (LAC), Pablo Vommaro, executive director of the Latin American Council of Social Sciences, argued that modernization must be grounded in justice, equity, public participation, and multilateralism. Today's world is fraught with uncertainty and inequality, and the modernization of Global South countries continues to confront multiple challenges. Amid the global restructuring of geopolitical order, the Global Governance Initiative (GGI) proposed by President Xi Jinping offers a crucial opportunity for advancing Global South modernization. Its principles, foundations, and vision respond effectively to the LAC region's practical concerns. As the world faces overlap-

ping environmental, cultural, and economic crises, the GGI's core principles provide a constructive roadmap.

Zhang Zhiqiang, director of the Institute of Philosophy at the Chinese Academy of Social Sciences, elaborated on the aims and essence of modernization. He argued that its ultimate goal is to achieve well-rounded human development, which lies at the heart of modernization. Philosophically, he emphasized, Chinese modernization resolves the contradiction between the general and the particular, and between the universal and the specific, by grounding the general laws of modernization in the concrete historical circumstances of each country.

Emerging from China's own civilizational foundations, this approach reveals a concrete form of moderniza-

tion, creating a new form of human advancement that reflects this distinctive characteristic, Zhang continued. Moreover, modernization of a huge population, one of Chinese modernization's five key features, signifies a form of modernization that can be shared and experienced by humanity as a whole.

"Modernization should not be evaluated solely by quantitative metrics on paper," Zhang added, "but should be judged by the wellbeing and prosperity of the people."

Tradition, modernity in dialogue

In the ongoing process of modernization, the relationship between tradition and modernity is not one of binary opposition or mutual exclusion, but rather one shaped by

continual overlap and mutual influence. Ancient civilizational traditions continue to provide driving forces for modernization, while modernization, in turn, breathes new vitality into tradition.

Drawing on experiences from LAC, Vommaro emphasized that tradition belongs not only to the past but also forms the foundation of future memory. He called for a critical and transformative approach to tradition and modernity, urging Global South countries to work together in fostering a new form of civilization—one characterized by diversity, inclusivity, and solidarity. Such a civilization, he argued, should be defined by mutual enrichment rather than competition, a conclusion drawn from the region's long history of struggle.

Marine Jibladze, a professor and director of the Confucius Institute at the Free University of Tbilisi in Georgia and president of the Association of Georgian Sinologists, offered her perspective on the interplay between traditional Chinese culture and contemporary diplomacy. She explained that Chinese diplomatic discourse often draws on classical philosophy, idioms, and proverbs—such as "the people are the foundation of the state," "great unity under heaven," and "harmony is precious." Traditions that emphasize reciprocity, honor commitments, and respect others, she said, continue to influence China's global engagement in profound ways and offer valuable insights for the modernization of the Global South.