



## A Historical Overview of the Evolution of Scientific Popularisation from the Twentieth Century to the Present Day

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### Abstract:

This article traces the evolution of the popularisation of science through three phases that have reshaped the relationship between science and the public. The early twentieth century saw the professionalisation of science, which created C.P. Snow's "Two Cultures" divide between experts and lay audiences. The Cold War era saw the introduction of the 'Deficit Model', which promoted the one-way transmission of scientific knowledge through the mass media and positioned science as an authoritative source of truth. However, the digital revolution has disrupted this hierarchy by enabling participatory communication. Contemporary challenges, such as institutional distrust and the proliferation of fake news, reflect the legacies of 20th-century communication paradigms rather than being new phenomena. The article concludes that future science communication must foster collaborative, trustworthy ecosystems that integrate expert knowledge with citizen engagement, rather than simply explaining science to the public, in an era increasingly shaped by artificial intelligence.

**Key Words:** Scientific popularisation, Science communication, Public understanding of science, Deficit Model, Mass media, Digital revolution, Science and society, Artificial intelligence

### ملخص

يتتبع هذا المقال تطور تبسيط و تعميم العلوم عبر ثلاث مراحل أعادت تشكيل العلاقة بين العلوم والجمهور. شهدت أوائل القرن العشرين احتراف العلوم، مما أدى إلى ظهور فجوة "الثقافتين" التي وصفها سي. بي. سنو بين الخبراء والجمهور العادي. وشهدت حقبة الحرب الباردة ظهور "نموذج العجز"، الذي روج لنقل المعرفة العلمية في اتجاه واحد عبر وسائل الإعلام الجماهيري ووضع العلوم في مكانة المصدر الموثوق للحقيقة. ومع ذلك، فقد قوضت الثورة الرقمية هذا التسلسل الهرمي من خلال تمكين التواصل التشاركي. وتعكس التحديات المعاصرة، مثل انعدام الثقة في المؤسسات وانتشار الأخبار المزيفة، إرث نماذج التواصل في القرن العشرين بدلاً من كونها ظواهر جديدة. ويخلص المقال إلى أن التواصل العلمي في المستقبل يجب أن يعزز النظم البيئية التعاونية والموثوقة التي تدمج المعرفة المتخصصة مع مشاركة المواطنين، بدلاً من مجرد شرح العلوم للجمهور، في عصر يتشكل بشكل متزايد بواسطة الذكاء الاصطناعي.



## Introduction:

Understanding the history of scientific popularisation is not just a historical study, it is necessary to comprehending the modern information ecosystem.

In this era, marked by the rise of fake news, climate change doubts and false medical information spreading online, it is essential to comprehend the ways in which the public-science connection has been established, maintained, and challenged. In many ways, the 'crisis of trust' that is often discussed today is a legacy of the communication paradigms that were created in the 20th century.

To ground this analysis, we need to define the terminology.

'Scientific popularisation' (also referred to as 'vulgarisation' in the French tradition) stands for a set of methods used to make specialised scientific knowledge understandable to non-expert audiences. This implies a translation or a simplification from a domain of 'high' knowledge to a general public consumption. The term 'science communication' has since expanded to include media relations, institutional communication, popularisation, and communication between scientists and various audiences. These definitions have evolved alongside the 'Public Understanding of Science' (PUS) movement, which aimed to evaluate and increase public scientific literacy.

Since 1900, scientific popularisation has gone through three distinct phases of evolution : the professionalisation of the scientific community, the rise and expansion of mass media, and the disruption of authority brought about by digital media.

## Professionalization and distance from the Public

### *The Professionalization of Science and the "Two Cultures"*

The beginning of the twentieth century was a turning point in how science was organized socially. In the 1800s, the line between the scientist and the educated public was not very clear. But by the early 1900s, science started to go back into the ivory tower of the modern university, and the paid academics and industrial researchers took place.

This process of making science more professional included the use of specialized language, peer-reviewed journals, and disciplinary « silos » that made it harder for people outside of the field to understand what was being said. Historians Peter J. Bowler and Iwan R. Morus say that this institutionalization was a double-edged sword: it protected scientists social status and funding, but it also cut off their natural connection to the public cultural sphere. The result was a growing divide that C.P. Snow later famously referred to as the "Two Cultures," which was a split between the scientific and literary/intellectual elites. In this new world, scientists who talked to the public too much risked being seen as suspicious by their peers.

### *Popularisers and the Media Landscape of the Early 20th Century*



Even though scientists were keeping their distance from the public, they still wanted to learn more about science. In the early 1900s, popular science media changed from the academic Victorian periodical to more sensationalist and commercial styles. A good example is Popular Science Monthly. It started out as an academic journal in 1872 that published the work of Darwin and Spencer. By 1915, it had been sold and given a new name. The magazine changed its concentration from long, theoretical essays to short, illustrated stories about gadgets, mechanics, and "wonders."

During this time, there was tension between the ideas that producing knowledge was seen as more distinguished activity than making things popular. Science writers and journalists started form their own groups, separate from scientists. This separation made people think that science was something to be "reported on" instead of something to be involved in. The "populariser" had to find a balance between the needs of the publishing industry and the need for scientific truth. This often led to sensationalizing scientific discoveries.

The two World Wars, especially the rise of nuclear physics, changed how people saw science in a big way. The Firts World War was probably the first "chemist's war," but it was the Second World War that really made physics known in people's minds. The atomic bomb made it very clear that theoretical physics had real and global effects on everyone.

The Physicists, historian Daniel J. Kevles writes about how this time period made scientists more powerful politically, and gave them more respect from the public than ever before. People loved the "atomic scientists," but the science behind it, quantum mechanics and relativity, was hard to understand. The scientist was depicted as possessing knowledge that the public could admire but never understand. This set the stage for the top-down communication models that were used during the Cold War.

## **Popular Science and the Deficit Model**

### *The context of the Cold War*

The Cold War and the Space Race defined the time after 1945 because people were so hopeful about technology. Science was the driving force behind national security and economic growth. In this setting, the "Deficit Model" of science communication became clear. This paradigm says that people are skeptical toward science because they don't know enough about it. So, the answer is to "fill" the general mind with accurate scientific information through one-way communication.

In this model, communication only goes in one direction: Expert → Media → Public, and "Scientific literacy" was the goal. This method was not just for learning, governments thought that if people knew a lot about science, they would naturally support financing for basic research and new technologies.

### *The Growth of Media and Formats*



In the middle of the 20th century, there was a huge increase in forms that fit this model. This is frequently called the "golden age" of popular science.

Television was an ideal medium for the visual display of science. Early efforts, such as the Johns Hopkins Science Review (1948), led to more complex works. The BBC's *The Ascent of Man* (1973) made documentaries a significant cultural form. Carl Sagan's *Cosmos: A Personal Voyage* (1980) is probably the best book of its time.

Newspapers added more specialized science sections, making science seem like a story of development and discovery that never ends. Massimiano Bucchi says that this coverage of science tended to show it as a finished result that was certain, objective, and authoritative, rather than as a chaotic process of doubt and discussion.

### *Institutions and the Institutionalization of Outreach*

At this time, making science popular became a formal mission of the institution. In the US, the National Science Foundation (NSF) and in France, the CNRS, began to require "broader impacts" or "culture scientifique" parts in grant financing. But even though it was called "interactive," the basic idea was still diffusionist. The public was asked to discover scientific truths that had already been decided, not to dispute the values or direction of the research. It was clear that the flow of information was still top-down.

### **The digital participation**

#### *From Public Understanding to Dialogue*

The 1985 Bodmer Report established "Public Understanding of Science" (PUS) as a policy domain, originally based on the deficit model. However, actual failures in the real world, showed that ordinary people had useful contextual knowledge that scientists had missed. Sociologist Brian Wynne's research illustrated this disparity, leading to a rhetorical transition from PUS to "Science and Society." This was a shift away from one-way teaching and toward real conversation, involvement, and participatory methods that take into account how complicated it is for people to connect with science.

#### *Digital Decentralization and Current Issues*

The Internet and Web 2.0 revolution broke the linear transmission model by taking power away from a central authority, content creators and citizen scientists are some of the new people who made interesting content about science. But this democratization brought with it huge problems: algorithmic amplification now favors sensationalist, anti-science content; misinformation spreads quickly, even though people have never had more access to scientific facts. The discussions around COVID-19 and climate change show that people's identities and political beliefs now have a bigger impact on how they understand scientific facts than the facts themselves.



## Conclusion:

In the 20th and 21st centuries, making science easier to understand has not been easy, due to the changement and evolution of power, media, and social contracts.

The institutionalization of science in the early twentieth century created a structural gap that led to the rise of the professional populariser. The Cold War and the rise of broadcast media made the "deficit model" stronger. This approach thought that science was an unquestionable authority that should be shared with people who were grateful for it. The failure of these top-down communication models and the rise of the internet have made it vital to have conversations, which have highlighted how intimately science, culture, and politics are linked.

Things have changed, but there is still a disagreement between authority (science as truth) and accessibility (science as culture) and a risk of instrumentalization.

But the most crucial distinction is that the voice of science is becoming less and less centralized. It's not enough for us to just ask, "How can we explain this to the public?" but "how can we build an ecosystem that both experts and regular people can trust and work together in?" This question will be the most significant one of the next hundred years as AI changes how information is created and shared.



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