Mainstream social media platforms as spaces for science communication (*X*, *Facebook*, *Instagram*, *TikTok*, *Bluesky*, *LinkedIn*)

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Abstract

This study analyses the role of generalist social networks (specifically *X*, *Facebook*, *Instagram*, *TikTok*, *Bluesky* and *LinkedIn*) as spaces for scientific dissemination. It starts from the paradox that it has never been easier to access scientific explanations and, at the same time, the context in which this content circulates has never been so fragile. It identifies audiences that trust science that follows affinity-based logic rather than purely informative logic, and algorithms that act as silent editors that prioritise the emotional over the verifiable. This analysis proposes that the evaluation of scientific dissemination on social media should incorporate qualitative evaluation criteria that lead to public debate.

1. Introduction

In recent years public discussion on almost any subject has passed through social media. These are the places where news, opinion pieces, entertainment and, increasingly, explanations of complex topics that used to be limited to academic or specialist circles are shared.

More than 81 per cent of the Spanish population had at least one social media account in October 2025. That is around 39 million people according to *We Are Social* (2025)[1]. These spaces are becoming, slowly and almost without us noticing, information counters for scientific knowledge. *X*, *Facebook*, *Instagram*, *TikTok*, *Bluesky* and *LinkedIn* were initially leisure or networking platforms. They have become stages where studies, explanatory threads and data visualisations circulate.

The fact that science has stepped outside the laboratory and arrived in our feeds is good news. It does, however, raise a question that we should at least consider. Are these platforms prepared to host rigorous science communication within an environment ruled by speed and virality.

The paradox of what we could call the scientification of social media is clear. It has never been so simple for someone to watch a video about vaccines, climate change, artificial intelligence or mental health. At the same time the context in which this knowledge is shared has never been so unstable. The algorithm does not always distinguish between a recipe video and an explanation of a scientific trial. Many users do not either. Science requires nuance, context and margins of error. Social media platforms reward punchy headlines and the kind of content that says I will explain it to you in 30 seconds. That is where the central tension appears.

Each platform offers its own conditions for communicating science. *X* values immediacy and public conversation, which is useful for alerts or for commenting on a study that has just come out. *Instagram* and *TikTok* favour visual and performative content through reels, carousels and short videos that turn complex ideas into digestible pieces. *Facebook* sustains stable communities that discuss on walls and in groups.

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[1] **Kemp, S.** (2025, October 15). *Digital 2026 Global Overview Report*. We Are Social UK. https://wearesocial.com/uk/blog/2025/10/digital-2026-global-overview-report

LinkedIn is emerging as a space where science, innovation and the labour market meet. *Bluesky*, which is still maturing, allows experimentation with smaller but more specialised audiences. The ecosystem is fragmented, but its potential reach is large.

One of the interesting aspects of this scientific activity on social media is that science is no longer a one way message that descends from the institution to the public. It has become a space for conversation, for replies, for real time questions and for public corrections. It has also become a space for different interpretations

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and even for those who criticise from preconceived and mistaken ideas. A researcher can publish a thread explaining the results of an analysis and another specialist can add nuance in front of all their followers. That kind of traceability in scientific discussion, which used to be hidden away in congresses, is now visible because of social media and this helps to democratise culture. It also exposes that discussion to misunderstandings.

Because not everything that looks like science communication actually is. On social media, authority does not necessarily come from years of research, from peer reviewed papers or from being invited to speak at Harvard. It often comes from follower counts and from the ability to adapt to the logic of the platform. We can mention the case of **Alba Moreno** (2025), a physics student whose very distinctive way of explaining science has made her into an influencer and science communicator at the same time. It is not common to find science communicators who have adapted so well to the medium. Her case shows that the problem is not the medium itself. The problem is how science communicators adapt to it.

There is also a gap on the user side. Users tend to reward those who communicate well rather than those who research well. Mainstream social media platforms widen the reach of science communication. They also flatten credibility hierarchies. Sometimes this is positive. Sometimes it is not.

Temporality is another important point. Science is slow. Social media is fast. Science requires research, review and contrast. Social media requires constant novelty. In situations such as health emergencies, for example during Covid, speed can be useful because it allows urgent information to reach the public. If the data are not properly checked before publishing, however, social media can become a serious source of confusion.

Despite this obvious friction, research teams, universities and scientists in general have understood that if they do not occupy these platforms then others will, and those others will not always be properly trained voices. The strategy at this point is to go where the people are, to translate science to the language of that place, but not to give up rigour.

Audiovisual formats have been key for this. An infographic is easier to digest and to share than a paper. A five minute video is more engaging than a 200 page study. Dense

fields of study become approachable when they are adapted to the space where they are shared. Scientific storytelling is no longer only text and graphs. It draws on advertising and journalism. It uses narratives, hooks, questions and problem solution sequences. Science becomes closer and reaches further.

Even so, the fact that social media can act as a loudspeaker for science does not mean it acts as an archive. Content gets lost in the noise and algorithms reward what is recent and spectacular. Circulation is guaranteed. Preservation is not. This places science communication in a peculiar position. In order to be seen it must adapt to the rules of the platform, yet if it adapts too much it risks diluting its own content. Visibility and depth are constantly being negotiated.

2. Theoretical framework

A wide body of scientific work agrees that science communication through social media increases positive behaviours. This supports the idea that science communication on these platforms has an influence on users (**Portman** *et al.*, 2025). The same author, building on his own research and on **Bergman** *et al.* (2022), points out that young people go to social media to interact with people who are similar to them. The same thing happens with science. They imitate the behaviour of those they admire. This is a sensitive issue. *UNESCO* (2025)[2] reports that 62 per cent of influencers share information without verifying it beforehand.

Other studies cited by **Portman** *et al.* (2025) show a positive relationship between using social media to get news and a higher level of trust in science. Posts by organisations and reputable sources, and posts with visually attractive layouts, graphs, data and clearly cited sources, increase the degree to which young people find science credible.

Cavanah and **Kemink** (2025) also highlight the importance of science communication on social media for preparing the population for politics. According to these authors, municipalities, regions and countries will shortly have to decide how to act regarding climate change and how to legislate on artificial intelligence, among other issues. Talking about these topics is therefore essential for training citizens. They write that these informational and comprehension needs can be covered by science based institutions, but only if those institutions are able to deliver the right message to the right person at the right time through the right medium. They also propose a specific logic model for social media. Inputs, activities, outputs and societal impact.

The work of **Habibi** *et al.* (2021) suggests we need to look more closely at something we often take for granted online. Reaching a lot of people is not the same as having a deep interaction with them. These authors distinguish clearly between reach and meaningful engagement. They argue, as we have already mentioned, that design and the way information is communicated can weigh almost as heavily as the scientific subject itself.

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[2] *Unesco* (2025). *Thinking without thinking? AI and cognitive autonomy.* *https://unesdoc.unesco.org/ark:/48223/pf0000392006*

As for formats, **Velarde-Camaqui** (2024) notes that on *TikTok* videos longer than one minute provide more complete information and satisfy users' curiosity. Subtitles do not appear to be decisive. The presence of a science communicator does.

We have also noted that, although *Bluesky* is still finding its place, it seems to have a better scientific environment than *X*. The authors do not list reasons, but algorithmic interference, bots, AI and the measures introduced by the owner of *X* may have led to some scientists moving from one network to another. For **Arroyo-Machado** *et al.* (2025) the turning point was the United States elections. It is worth remembering that Musk supported Trump in those elections.

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To give a broader view of science on social media, **Coletti** *et al.* (2022) bring together several trends that had previously appeared in isolation. These trends are the growing visualisation of scientific content, for example infographics, short videos and carousels, the weight of personal branding among researchers and science communicators, the mixture of entertainment and science, and the limited neutrality of algorithms when deciding which scientific content actually reaches audiences. For these authors, social media opens a new stage of public communication of science, although it is clearly conditioned by the attention economy.

We know a great deal about scientists and communicators who have found in social media a fertile ground for sharing science. We know less about audiences. We still need to know what people understand, what they misunderstand, what they find credible and what they ignore, and how scientific posts shape their perception.

The focus should therefore shift from those who produce and optimise scientific content to those who receive it. The evidence reviewed here suggests that young audiences approach science on social media following rationales of affinity rather than strictly informational ones. This means that credibility is not placed only in the scientific institution. It is also placed in the figure of the mediator and in the format through which the information is presented. If the platform rewards brevity, novelty and spectacularisation, the audience will tend to consider as scientific any content that follows those rules, even when it has not been verified. Understanding audiences is not only a matter of measuring reach. It is also a matter of measuring trust and the way users incorporate content into their lives.

To move towards more responsible science communication on mainstream social media platforms it is essential to introduce methods that stop focusing only on the communicator and capture audience interpretation. The aim is to see whether engagement becomes understanding and, potentially, informed participation in public debates such as those mentioned by **Cavanah** and **Kemink** (2025). Only then will we move from describing a brilliant but superficial circulation of science to explaining how audiences, with their affinity driven criteria and limited attention, are contributing

to a new definition of twenty first century science. What science is seen, how it is understood and what social value is attached to it.

3. Development

The first conclusion we can draw from everything outlined above is that science communication on mainstream social media cannot be analysed as if all platforms were the same. Each platform imposes technical conditions, such as video length and post length, and also cultural conditions. What is praised on *LinkedIn* because it sounds authoritative, professional and institutional can sound artificial on *TikTok*. What works as a thread on *X* needs to become a carousel or a reel on *Instagram*. This obliges science communicators to produce a kind of multiple translation. They no longer have to translate science into the language of citizens just once. They have to translate it into five or six platform languages without losing the main line of rigour.

A second point is that young audiences prefer to access science through their own logic of affinity. They do not follow science in the abstract. They follow their science communicator. This link is an excellent gateway into science. A considerable number of users stay at the entrance though. If the mediator makes a mistake, the mistake travels because the mediator already has the audience's trust. This is why *Unesco*'s figures (2025) are so worrying. Audiences trust the person they see every day more than the institution they never see.

Another central element is the role of algorithms as silent editors. Platforms host science, even if they are not reliable archives, and they also order, prioritise and hide content according to criteria that have little to do with veracity. The result is that the science which circulates most easily is the science that looks most like the platform's native content. Not necessarily the most robust science. This algorithmic interference even explains why some scientific communities feel more comfortable on smaller platforms such as *Bluesky*.

We should also consider the growing professionalisation of science communication on social media. Universities, public agencies, research centres and scientific teams are opening specific accounts. They monitor metrics and even test what tone they should use to speak to their audiences. This institutionalisation has a double effect. It helps to raise standards and to fill the gaps left by unverified content. It also introduces institutional agendas into a space that was born informal, which can alienate some users.

Competition for attention pushes communicators towards a more emotional style. Explaining a paper is fine. Explaining what problem it solves and how it affects the audience is better. This is not necessarily negative. Science communication has always had a narrative side. It does, however, require specific training. Not every researcher has rhetorical, audiovisual or journalistic skills. Audiences demand these skills.

Science needs traceability. It must be possible to go back to the original data. Social media are designed so that content ages quickly. A discovery or an important update

can be forgotten once the 24 hours of a story have passed. One way of solving this is to pin posts to the profile, to maintain a parallel blog or newsletter and to build a wider ecosystem. That means stepping outside the pure logic of social media.

Temporality is another important point. Science is slow. Social media is fast. Science requires research, review and contrast

If science is going to continue to be present on mainstream social media, and everything suggests that it will, we need specific strategies for each platform. We also need ways of measuring that go beyond likes. A possible solution is to reduce noise, to analyse comments, to look at the quality of users' questions and to see whether conversations shift towards democratic aspects such as demanding accountability on climate change, artificial intelligence or mental health. Only by looking at it in this way will we see a form of science that is genuinely educational.

4. Assessing science communication

We have accepted that each platform requires a specific strategy. It follows that we cannot measure them all with the same instrument. Likes and views tell us whether we appeared in someone's feed. They do not tell us whether people understood the content, whether it was trustworthy or whether it affected their everyday decisions. Assessment therefore needs to move towards more qualitative and contextual indicators. We do not only want to know who liked the post. We want to know what people said, which parts caused confusion, which parts were shared with an added comment, which parts of the discourse users appropriated. This second level of use shows whether we have reached beyond superficial attention.

The aim is to move from the kind of obvious disinformation that appears when an audience asks what this vaccine is for to the kind of question that asks what population was in the sample. When audiences begin to ask this kind of question it becomes clear that they are learning to read science in social media formats. Beyond metrics, when a post leads to regulation or to discussions on policy, then science has gone beyond the social media space and has had a social impact.

Platforms already offer quantitative data such as retention figures, link clicks and saves. These tell us more than likes because they indicate intention. If we add to that the systematic reading of comments, quick surveys in stories and monitoring of how other outlets or users follow up on our content, we can say that science is achieving what it should achieve. Informing, building trust and activating citizenship.

5. The era of misinformation

Science is not exempt from the era of misinformation and post truth. Social media platforms give the same space to a science communicator and to an influencer who spreads pseudoscientific content. This works against science. The second one can reach similar or higher figures and can generate discussion and engagement that the scientific post does not.

We have already noted that algorithms do not distinguish between content that has been scientifically validated and content that sounds scientific. If we add to this the

hidden agendas of mediators, the result is a competitive and noisy environment in which audiences must make an extra literacy effort so as not to confuse science communication with an opinion that is dressed up with data. Users go to social media to look at memes, comment on current events and keep in touch with their circle. They rarely carry out fact checking.

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Another risk is decontextualisation. A lot of scientific content is only valid for a specific moment in time, as happened with Covid. Social media recirculate this content without dates, without sources and without warnings. The evidence has changed and the content should have changed as well, but the algorithm is not aware of evidence. To address this, many science communicators already add clear time stamps, such as data updated on, and publish revisions. This is not yet the general rule.

Everything set out in this and in previous sections shows that science is already present on mainstream platforms, but that it is still vulnerable. It depends on platforms that were not designed for knowledge traceability. They were designed for constant content rotation. Communicators have to join in and adapt formats without diluting content. They have to compete for attention without falling into sensationalism. They have to take advantage of the closeness of the medium without losing authority. The good news is that the ecosystem already has the tools to do this. The bad news is that if they are not used, science communication becomes superficial and is easily confused with entertainment.

It is therefore clear that success in science communication cannot continue to be measured as it was. It was seen a lot, so it worked. If audiences continue to reward those who communicate better over those who research better, algorithms will continue to prioritise the emotional over the verifiable and misinformation will continue to find ways to come between science and citizens.

6. Conclusions

The presence of science on mainstream social media is a logical consequence of the fact that most people, especially younger people, have moved their everyday information consumption to these spaces. These platforms have become channels through which scientific knowledge circulates because that is where people are.

This does not mean that this transfer of knowledge takes place under the ideal conditions that science requires. Speed, spectacularisation and limited attention are at odds with the need for verification and context.

This study, in line with many others, shows that the success of science communication on social media depends mainly on how well it is adapted to each platform and on the mediating figure who shares it. We have seen that audiences reward closeness, adaptation to the format and emotional resonance before they reward scientific authority. This means that more people are exposed to science. It also means that more

people are exposed to pseudoscience that imitates scientific codes. In order to improve science communication we therefore need to measure more complex questions, better informed comments and our real ability to influence public conversation on scientific issues such as climate, AI or health.

> Science needs traceability. It must be possible to go back to the original data. Social media are designed so that content ages quickly

Two efforts are necessary. On the one hand, specific strategies for each platform that allow us to maintain rigour without losing reach. On the other hand, the creation of protection mechanisms against scientific misinformation, for example visible sources, time stamps, revisions and clarifications on the current state of the evidence. If scientific institutions, science communicators and specialist media do not occupy these spaces with well designed content, then others will, with their own agendas.

The key conclusion is not whether science should or should not be on social media. The key conclusion is that science should be on social media, but it should be assessed with sharper criteria and it should be communicated with a full awareness of the rules of the platforms.

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