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Science on the Feed: How science is represented on TikTok

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Abstract
Social media platforms, such as TikTok, shape how scientific knowledge is encountered and shared. Alongside professional science communicators, amateur creators also contribute to science-related content on TikTok. This thesis examines how science is communicated on TikTok through a qualitative and quantitative content analysis of 30 videos that focus on the topics of science, artificial intelligence, and climate change. The analysis investigates the differences between professional and non-professional creators, specifically regarding communication strategies and the use of visuals, audio, credibility cues, references, and how an algorithm has potential influence on this. The findings indicate that professional creators tend to use more neutral tones and clearer references yet often receive lower engagement than non-professionals. Across all categories, scientific claims were often unsupported or only vaguely referenced. It is concluded that while TikTok might lower the barrier to encounter scientific information, this information is often presented in simplified ways and without clear references to valid sources.

1. INTRODUCTION

As someone who regularly frequents online spaces, so much so that I would consider myself a chronically online person, a person who is closely engaged with internet culture (Extremely online, 2025), I also enjoy learning about different topics. Fortunately, in today's technological age, these two can go hand in hand. Social media platforms, such as TikTok, offer short-form video content in which people talk about scientific topics, making it easier than ever to come across educational content while scrolling (Frick et al., 2025). TikTok's core feature, the For You Page (FYP), uses an algorithm that learns users' preferences through their interaction with videos and generates a stream of new videos the user is most likely interested in (TikTok, n.d.-a). Videos typically last 15 to 60 seconds and often include trending sounds or collaborative features like stitches, a video that responds to another video, beginning with a short clip from the original (TikTok, n.d.-d). These features are used by creators who are all competing for visibility on the platform and thus shape how scientific topics can be communicated online (Klug et al., 2021).

Platforms such as TikTok have become part of our everyday life, particularly among younger people (Kanthawala et al., 2022). Sharing photos and short-form videos online remains one of the most popular digital activities among teenagers and young adults, who together represent the largest user demographic of TikTok in the United States (Klug et al., 2021). Short-form video content is typically characterised by rapidly evolving memes, trends, and the reuse of popular sounds, allowing users to participate in shared moments with minimal production barriers. TikTok's influence is further reflected in its scale, with over one billion monthly active users and more than one billion daily video views worldwide, driven largely by its Gen Z dominated user base (Boeker & Urman, 2022; Quick & Maddox, 2024). In response to TikTok's popularity, competing platforms have introduced short video options as well to their platforms, with Instagram introducing Reels and YouTube including a Shorts section.

With such a large pool of users on one platform, it has become easy to access information on many topics, including scientific ones. Visual explanations and informal storytelling can both help simplify complex ideas and make viewing new information more engaging to a non-expert audience, thereby shaping how scientific information is encountered in everyday scrolling (Frick et al., 2025).

A platform like TikTok is driven by an algorithmic recommendation system that shapes what content is seen

by users (TikTok, n.d.-b), while the accuracy of the information is not always a primary concern for these algorithms (Boeker & Urman, 2022).

Algorithms already play a significant role in our lives, from work and entertainment to everyday consumer interactions (Lee et al., 2022). They influence decisions as varied as what movie to watch next on Netflix, a match with your potential new partner on a dating app, or whether a job application gets filtered out. The algorithm of TikTok, or other social media platforms in that matter, often prioritises content based on engagement metrics, such as likes, shares, watch time, and comments, rather than on educational value or scientific accuracy (Boeker & Urman, 2022; Klug et al., 2021). As a result, videos that are entertaining and sensational can reach wider audiences, even when the information they present might not always be fully accurate. This raises concerns about how public understanding of scientific topics is shaped in these digital environments. When accurate information competes with misleading or simplified narratives in the same space, it becomes harder for audiences to determine what is true or not.

A wide range of actors now contribute to the spread of science communication and scientific information online, including researchers, journalists, educators, influencers, and laypeople with the potential to be seen by thousands or even millions of people (Côté & Darling, 2018; Frick et al., 2025; Hunter, 2020; Kresin et al., 2025; Lundgren et al., 2020; Zhang & Lu, 2023). This has created a participatory and decentralised science communication landscape, where boundaries between authority and entertainment are blurred. While this diversification of creators can democratise access to scientific knowledge, it also raises concerns about the accuracy, framing, and trustworthiness of the information presented in these videos (Zeng et al., 2021).

As TikTok becomes a source of scientific information, it is important to understand how science is communicated on the platform. The way scientific content is presented online can influence public understanding of science, trust in experts, and the spread of accurate or misleading information (Kresin et al., 2024). In this context, TikTok has become an influential platform, combining short, attention-grabbing videos and using algorithms to shape what viewers see.

To better understand how science is represented on TikTok, this thesis qualitatively and quantitatively analyses how scientific content is communicated on TikTok. The study is guided by the following research questions:

RQ1. How does the representation and communication of science differ between professional science communicators and amateur creators on TikTok?

RQ2. What communication strategies and narrative techniques (e.g., storytelling, humour, or framing) do creators use in their TikTok videos?

RQ3. How are visuals, sounds, and editing styles used in TikTok videos about scientific topics?

RQ4. How accurately is scientific information represented in TikTok videos? How are references to scientific content and researchers handled? And what forms of simplification or distortion of information occurs?

Chapter 2 reviews relevant literature on online science communication, TikTok and its algorithm and engagement cues. Chapter 3 outlines the methodology used for data collection, the construction of the coding scheme and analysis. Chapter 4 presents the results in response to each research question as stated above, and finally, the fifth part discusses the findings, their implications, the study's limitations, and offers concluding reflections.

2. LITERATURE REVIEW

2.1 Shift in Science Communication

Before the rise of social media in the early to mid-2010s, science communication was largely a one-way flow of information (Keng & Cheng, 2023). Communication about science originating from within the scientific community has traditionally targeted two distinct audiences: scholarly communication, which is internal and contributes to a researcher's reputation, and science communication, which is external and directed at society. (Frick et al., 2025). Traditional models of science communication have typically operated under a knowledge deficit framework, assuming that the public is uninformed and emphasising one-way communication to address scientific illiteracy (Frick et al., 2025). Social media has transformed science communication into a more interactive model, according to Keng & Cheng (2023) and has become blurred due to digitalisation, social media, and open access, allowing anyone to

participate in scientific discussions and enabling a two-way exchange of ideas between researchers and/or the public through comment sections or response posts. This shift has made scientific knowledge more accessible and visible. By sharing their work online, scientists are making it easier to reach wider audiences and potentially increasing the impact of their research through greater visibility and citation rates (Özkent, 2022). However, this increased accessibility of information also comes with challenges related to misinformation and audience engagement. Social media does not convey nuance well, which is problematic since science often requires nuance (Hunter, 2020).

2.2 The TikTok Environment: Algorithms and The Attention Economy

TikTok is driven by an advanced recommendation algorithm system. One that quickly catches on to what users' preferences are and shows these videos on their personalised FYP (TikTok, n.d.-a). Unlike other social media platforms, such as Instagram, Facebook, or YouTube, where short-form videos are just one feature among others, from photo sharing, long videos, or text posts, TikTok is mainly centred around the short-form video format. TikTok is unique in that it is built for discovery and interaction through user-generated short-form video content, rather than primarily for maintaining connections with friends and family, as is the case on other platforms (Klug et al., 2021). On platforms like Instagram or Facebook, users typically share content within a selected network of friends or followers. In contrast, TikTok's algorithm pushes videos to a much wider audience through the FYP, meaning that, unless an account is set to private and restricted to approved followers, almost any video has the potential to be shown to strangers. This platform design encourages interaction with people outside of someone's immediate social circle and makes trends and viral participation central to the TikTok experience (Kanthawala et al., 2022).

TikTok's algorithm, like any other, is not static; it is continually adapting and changing to users' behaviour and trends. While the exact way the TikTok algorithm works remains undisclosed by its Chinese parent company, ByteDance, TikTok (n.d.-b) themselves say on their website they recommend content based on three main factors: user interactions, content information, and user information.

Some studies suggests that people believe they can influence the algorithm. Lee et al. (2022) concluded that frequent and heavy TikTok users believed that the algorithm learned who they were and what they liked by analysing traces of their behaviour; many of them perceived their experiences as the algorithm attempting to understand and reflect them.

Although having content on social media feeds that matches one's interests' benefits users, it also has a downside. An algorithm can contribute to filter bubbles or echo chambers, creating environments where users are exposed only to information deemed interesting and relevant to them, while filtering out disconfirming content (Kresin et al., 2024). Echo chambers then reinforce those existing beliefs among users in similar filter bubbles, prohibiting nonconformity and potentially leading to "scientific consensus [being] openly rejected" (Kresin et al., 2024).

Monetisation mechanisms on social media platforms influence what creators choose to post. Platforms such as YouTube and TikTok share a portion of their advertising revenue with creators, enabling people to earn income directly through views and audience engagement. In addition to platform-based revenue, creators can have sponsorships. Where companies will compensate creators, either financially or through products, in exchange for promoting specific goods or services in a video. However, monetisation opportunities are not available for everyone. TikTok's Creator Rewards Program is restricted to certain regions, and you must have a certain number of followers and views (TikTok, 2025), meaning many creators cannot rely on this feature at this moment. Despite this, the underlying incentive remains, visibility drives opportunity. Increased exposure leads to higher view counts, which can generate more interactions (likes, comments, shares). Engagement signals relevance to the platform's algorithm, producing a feedback loop in which more engagement leads to amplified visibility and, consequently, increased access to monetisation opportunities like payment by the platform, sponsorships, or promotion of their own brands. Creators play into this by asking people to like, share, comment, and/or follow the account. According to findings from Zannettou et al. (2024), user engagement in the form of likes is higher for videos uploaded by creators who users follow compared to content recommended by accounts they do not follow.

These monetisation dynamics operate within the framework of the attention economy, a system in which human attention is treated as a limited and valuable resource (Heitmayer, 2025; Simon, 1971). Since financial reward is linked to visibility, Bishop (2018) argues that YouTube content creators are incentivised to perform visibility labour. In practice, this means producing commercially attractive content that keeps viewers watching for longer and complies with advertiser-friendly standards. As a result, content that is more experimental or non-normative to the platform is less likely to be promoted by the platform and may remain largely unseen. To survive and remain visible, creators may use attention-grabbing techniques designed to captivate the audience within the first few seconds (Abidin, 2020).

Notably, this pressure to sell content is not limited to social media; a similar trend has been observed in academic publishing, where scientists use clickbait tactics, such as positive framing and sensationalised titles, to compete for online attention and citations (Lockwood, 2016). Drawing on Heitmayer's (2025) conceptualisation of attention as a scarce resource, relying on attention-grabbing hooks can be risky: platforms encourage engagement over sustained focus, causing users to consume isolated bits of content without the context needed for nuance.

2.3 Source Credibility and Persuasion in Online Space

Scientists may use social media to connect with other researchers or reach a broader, non-specialist audience. Côté & Darling (2018) observed that scientists with smaller online followings often had a close circle of fellow scientists, but as their followers grew, they increasingly attracted non-scientist followers as well. While credibility is often linked to formal expertise, audiences may place greater trust in amateurs or influencers when there is a high volume of user engagement. Research from Flanagin and Metzger (2013) suggests that a large number of ratings, likes, or endorsements can signal consensus and familiarity, making amateur voices appear more trustworthy than expert ones. In such contexts, social validation can become more important than scientific expertise as a marker of credibility.

Research on TikTok and its Chinese version, Douyin, indicates that parasocial interaction (PSI) plays a significant role in shaping persuasive outcomes across different cultures. Yang and Ha (2021) found that while most Douyin users visit the platform for entertainment, those who use it to connect with others tend to understand persuasive content more effectively, form stronger bonds with influencers, and are more likely to purchase recommended products. Similar findings on TikTok suggest that factors such as perceived influencer loyalty, willingness to share, and openness enhance PSI, which in turn increases purchase intention (Hammond et al., 2025). Their study also demonstrates that the virality of TikTok videos can influence purchase intention even without the presence of parasocial bonds. Together, these studies suggest that user motivations are important, but PSI serves as a crucial mechanism linking influencer communication to consumer persuasion.

2.4 Narrative Strategies and Emotional Framing

Creators can deliver their messages in different ways, and these presentation choices influence how users perceive the information and engage with the video. From a narrative perspective, humour can serve as an emotional frame. Wang (2020) concluded that in the context of smart home technology TikTok videos, excessive humour may backfire, distracting viewers and reducing immersion when compared to more subtle narrative applications. Rather than humour being the main persuasive force, its real value lies in fostering *Social Presence*, the feeling of genuinely engaging with a creator. This emotional connection is central to persuasion: the study found that 'Social Presence', not humour alone, accounted for nearly 57% of the influence on users' decisions to adopt the technology.

Cheng and Li (2023) found that TikTok videos expressing positive emotions tend to generate lower levels of viewer engagement. In contrast, content characterised by negative emotional expression was associated with higher engagement, as measured through likes, comments, and shares relative to views. Their findings suggest that negatively charged content is more effective at prompting audience responses on TikTok.

Herasymiuk (2025) argues that short-form videos rely primarily on physical action rather than dialogue. Using editing techniques, such as rapid jump cuts, creators establish a fast-paced rhythm that activates *embodied simulation* in viewers. This process could shape the emotional frame, allowing audiences to physically

experience the movement on screen, creating an immediate connection without words to the creator.

Research by Eknes-Riple et al. (2025) confirms that news recommendation systems explicitly punished *Hope* while rewarding *Fear*. Their study on news recommender systems found that content framed with fear significantly increased user clicks, whereas hopeful framing led to reduced interaction.

These studies collectively demonstrate that emotional framing, humour, emotions, movement, or the presentation of information in digital media can significantly impact engagement and persuasion.

2.5 Visuals, Audio, and Editing

Following trends is a way of gaining visibility on TikTok. They are easy to hop onto and be pushed by the algorithm. Trend cycles tend to be short, around 2 days to 3 weeks (The Shelf Team, 2024). This comes with both an opportunity and a challenge for creators.

Unlike Facebook or X, previously known as Twitter, where audio is often secondary or muted by default, TikTok is a platform where audio is one of the most important features. Sound is not just background noise; it has a meme factor (Bainotti & Peeters, 2025). A specific audio track, a snippet of a song, a line of dialogue from a movie, or a specific sound effect can become a trend that dictates the content on the feed (Abidin, 2020).

However, it can also be done without sound. Closed captions are an effective way to improve accessibility for a wide range of viewers, especially people who are deaf or hard of hearing. They ensure that video content can be understood even without sound, which also benefits people who watch videos in noisy environments or who choose to keep the audio off (Utah State University, n.d.). In addition, captions can make content more engaging and easier to follow for all viewers, including those with learning differences, non-native speakers, or anyone who finds reading along helpful (Gernsbacher, 2015). TikTok has included its own integrated auto-captions feature since 2021 (Hind, 2021). Evidence that closed captions can benefit platform algorithms can be found on webpages of TikTok trend-analysis blogs (*TikTok Caption & Subtitle Best Practices in 2026*, 2025). Providing captions could increase the reach and visibility of content, since videos with captions tend to receive more views and may be favoured by the algorithm.

The way a person is positioned on screen can also have an influence on how the video is perceived. Prior research suggests that specific camera perspectives can intensify viewers' feelings of immersion and presence (Wang, 2020). On TikTok, this effect is particularly pronounced because content creators often appear to address the viewer directly, creating a sense of personal engagement. Cheng and Li (2023) distinguish between three dominant camera perspectives in news-related TikTok videos. First-person perspectives place the viewer in the position of the narrator, encouraging a sense of virtual participation in the reported event. Third-person perspectives, by contrast, position the narrator as an external observer, creating greater distance between the viewer and the event. Most characteristic of TikTok is the second-person perspective, in which the creator speaks directly into the camera. Their findings indicate that videos with a second-person perspective more frequently achieve significantly higher like-to-view ratios across both professional news publishers and non-institutional creators.

According to Mayer's Multimedia Learning (2002), learning is enhanced when verbal and visual information are meaningfully aligned. TikTok affordances such as green screen, duet, filters, and stitch allow creators to combine spoken or written explanations, like closed captions, with visual material. TikTok frames the Green Screen as a creative tool that can "take content to the next level" (TikTok, 2019), while Duet and Stitch allow users to place videos side-by-side or integrate segments from other videos (TikTok, n.d.-c). In line with Mayer's principles, these combinations support learning when visual and verbal elements reinforce rather than distract from one another.

2.6 Accuracy and Simplification

With only having a handful of seconds in a video, it is hard to condense a lot of information, especially scientific information. While simplification is a necessity for accessibility and engagement, oversimplification risks stripping away the very nuance and context that constitute the scientific accuracy of a finding (Thornton, 2025). Research by Celik et al. (2021) suggests a paradox where people online are more likely to believe information that is easy to process (short, simple, and narratively consistent), even if it is factually incorrect. Their research found that on social media, users often hold simplistic and

uninformed beliefs about knowledge. They tend to view knowledge as a collection of straightforward, indisputable facts rather than complex concepts. Furthermore, a study by Cho et al. (2024) suggests that narrative consistency often overrides factuality in persuasion; if a message rings true or resonates emotionally, users prioritise this over objective verification.

As a result, the features that make short-form videos engaging, being short and entertaining, can unintentionally give more attention to misinformation than to rigorous science. To add to that, academic rigour requires citation; in the academic world, it is fundamental. TikTok's interface makes citation difficult. Hyperlinks are not clickable in TikTok captions or the comment section, making it harder for people to access these sources.

3. METHODS

3.1 Methodological Approach

To begin developing a coding scheme, a new TikTok account was created to compile an initial small dataset of videos that served as the basis for the first version of the scheme. This account was primarily accessed through a personal mobile device. Since this device already contained prior usage data from personal use, including being logged into a personal TikTok account, this may have influenced the algorithm's initial outputs (TikTok, 2024).

Using the mobile device was a deliberate choice. When accessing TikTok on a private browser on a personal laptop, the FYP predominantly displayed generic memes and funny content in Dutch. Whereas the mobile FYP aligned more closely with the themes searched for in the study. This could be attributed to having searched these terms on the phone rather than on the laptop. Consequently, this meant that the personal phone was used for the development of the initial coding scheme.

To provide the algorithm with initial input and personalise the FYP with content used for the study, three hashtags were used as search terms:

- #science
- #ai
- #climatechange

These three search terms were used because climate change is already widely discussed in science communication literature, making it a well-established topic for the analysis. AI was included due to its growing relevance in the public and scientific discourse. The more general term science was included for comparison across topics, allowing the study to explore whether differences appear in communication styles, credibility, or claim verification between specific subject areas and science-related content more broadly.

For each search hashtag, several videos were watched and interacted with by liking the videos. After that, the refreshed FYP was revisited, and all content related to the hashtags was interacted with, through liking, to generate a stream of videos related to this topic on the FYP. Since watching and liking videos on the FYP signals interest to the algorithm, it responds by frequently recommending similar content (Klug et al., 2021).

In the early stages, the algorithm presents a wider variety of content to learn more about the user (TikTok, n.d.-b). The content on the FYP was neutral in tone. Many videos focused on topics that were searched for, such as science, climate change, and artificial intelligence. Other topics, like politics, philosophy, and anti-capitalism, were also shown but ignored by not liking the videos and scrolling past them more quickly.

3.2 Categories

Based on the initial observations and existing literature, a grounded research approach was used to develop a coding scheme. Categories were constructed inductively to reflect recurring patterns observed across videos on the FYP. A first round of coding was conducted on a total of 22 videos related to the topic. Insights gained from this process informed a slight refinement of the categories for the final analysis.

Maker and Account Type. The *Maker* category identified how individuals in the video presented themselves, specifically whether they appeared as a scientist, journalist, layperson, or other. *Other* was used for brands, organisations, or accounts where no individual identity could be determined.

A separate category, *Account Type*, distinguishes between the source of the upload: experienced creators, brands (including organisations), casual creators (typically laypersons), and repost accounts.

Accounts were coded as scientist only when the creator explicitly listed scientific credentials (e.g., Dr., PhD, or MD) in their username or profile biography.

Creators without such indicators, posting primarily unrelated content to the scientific topics, were categorised as *laypersons* and *casual creators*.

Persuasion (Credibility Cues). To analyse how authority was established, credibility cues were examined. This involved noting whether creators referenced credentials verbally (e.g., stating "as a scientist") or stating their credentials in their profile bio. When such claims were made, the coding verified only whether the claim was consistent with the profile display. The actual legitimacy of the credentials, such as institutional affiliations or publication records, was not assessed. Therefore, these claims were treated at face value.

Narrative Structure. This category looked at how creators structured storytelling in their videos. Coding identified whether the content followed a clear narrative pattern, such as problem-solution, question-answer, or claim-evidence. This category was defined by recurring patterns in the data and drawing on research on narrative structures in audiences. For example, Huang and Grant (2020) found that YouTube videos in which creators addressed the audience with a dramatic question tended to perform well. Problem-solution was defined as when the creator starts the video with a problem and further elaborates on a solution, ideally using science. Question-answer when the video starts off with a question from either a commenter or the person in the video themselves presents the question and ends up answering in the video. Lastly, claim-evidence was where a creator starts the video with a statement and then continues in the video explaining it further, ideally again with scientific backup.

Topic. The primary focus of the content was categorised as education, activism, commentary, or news. Each video was assigned to the category that best reflected the creator's primary intention. While the *Education* category was expected to be dominant, *Activism* was included to account for climate change-related content, and *News* was added based on trends observed during the initial rounds of coding.

Visual Representation & Overlay. To classify the format of the videos, visual representation was coded into three distinct styles:

- Animation: Videos that use animated graphics or motion design.
- Podcast Clip: Excerpts that appeared to be taken from longer interviews or podcasts.
- In Front of Camera: Videos where the creator speaks directly to the camera (second-person view).

Separately, Overlay noted the presence of additional visual elements, such as text, images, or video clips edited in the form of b-roll, into the main content.

Series. Since TikTok consists of short videos, content on a single topic can be split across multiple videos. For this reason, videos were coded as Part of a Series or not Part of a Series. Coding was based on explicit indicators, such as the creator verbally stating or displaying "Part 1" or "Part 2" in the video. These indicators were observed during the first trial and, therefore, added to the scheme.

Engagement cues. When creators verbally or visually encouraged viewers to interact with their content, such as by requesting likes, comments, or shares, or using on-screen inlays to prompt engagement, these actions were annotated under engagement cues. Creators can use this since interaction on a video can be beneficial for the algorithm (Klug et al., 2021 & TikTok, n.d.-b).

References. References included counting the number of references mentioned in each video. Categorising them as: scientific papers, people mentioned by name, webpages/blogs, or other. References were counted for each category separately. Coding was based solely on the references explicitly mentioned or shown in the video, without verifying their accuracy or authority.

Claims. To assess the accuracy of claims in the videos, each statement referring to scientific concepts was examined and assigned to one of four categories:

- Unsupported: Statements made without reference to any scientist, study, or paper.
- Partially Supported: Vague references to authority (e.g., sentences like "experts claim" or "scientists say").

- Supported: A specific person was named, or a source was visible/cited verbally.
- Strongly Supported: The speaker clearly named and cited a specific paper and journal, providing verifiable evidence.

Audio. Since sound is such a central part of the TikTok experience, each video was coded to identify which specific audio elements were used. Aside from the creator's direct speech, audio was categorised into four types: voice-overs (narration added after filming), popular songs (trending or commercial music), ambient sound (music without lyrics), or silence. These categories were chosen since popular songs can increase a video's visibility through the platform's algorithm, while ambient sound is often used to establish a specific mood that could reinforce the overall message.

Emotional Tone. The emotional tone of each video was coded to determine how the presentation style influenced the delivery of the message. Emotional tone was noted based on the main emotion expressed through the creator's language, expression, visual cues, and overall framing of the content. Videos were coded as *humour* when the creator primarily relied on jokes, sarcasm, or memes, while a *relatability* tone was assigned when creators used everyday examples, personal experiences, or directly positioned themselves as similar to the audience. *Urgency* was coded when videos emphasised the need for immediate action or time pressure, while *fear* was coded when the framing focused on threats, dangers, or negative consequences. *Excitement* was identified through enthusiastic delivery, heightened energy, or celebratory tone, whereas a *neutral/formal* tone was assigned to videos that focused on factual explanation with minimal emotional expression.

These categories were included since they serve different communicative purposes. Humour and excitement were included to increase engagement, while urgency and fear were used to emphasise the seriousness of the topic and encourage action. Relatability was included to capture content meant to build a personal connection with the audience, while a neutral/formal tone indicated a purely informational approach. Based on the theory outlined above in the literature review, algorithmic negativity bias may explain the choice of emotional framing.

Audience Engagement. Engagement was measured by the like-to-view ratio, calculated as the number of likes divided by the number of views and multiplied by 100 (likes/views × 100). On TikTok, engagement ratios between approximately 5-10% (equivalent to a 1:10 like-to-view ratio) are commonly considered indicative of relatively high engagement (Kempe, 2023). All likes and view counts were recorded on October 13th, 2025, to maintain consistency in the timing of measurements across the dataset.

3.3 Exploratory Phase

A second TikTok account was created and exclusively accessed through a wiped iPad devoid of any personal data or prior usage. After downloading TikTok, the device was logged out of the Apple App Store to ensure a clean slate and avoid contamination from previous user data. This step was done to prevent the algorithm from recommending videos based on the previous coding scheme, thereby avoiding repetition.

The same three hashtags (science, AI, and climate change) were searched, and videos on the *Top* page were watched. On the FYP, all videos related to the three hashtags were liked, such as sustainability, technology, and physics, to signal interest to the algorithm. Consequently, most videos on the FYP were related to these topics, with varying quality.

On October 13, 2025, the final analysed videos were collected. Thirty videos were saved per category, and a random number generator was used to select the final sample of ten videos from each category.

3.4 Archiving Procedure

For all relevant videos appearing on the FYP, the link was copied and stored in a spreadsheet and given an ID number. Separately with the ID number, the number of views, likes, hashtags used, and the date posted were saved.

The act of saving or sharing a TikTok video is not a neutral process. When a link is shared through the sharing feature, it becomes tied to the originating account. If another user clicks on the shared link, TikTok will notify the sender that the person's account has seen the video and prompts to follow the account from which the content was shared, and the account sharing the link gets a notification that the account has watched the video that they have shared, as shown in Figure 1. Research

practices, like archiving videos, become entangled with TikTok's larger system of recommendations and network-building and could potentially influence the algorithm as well, since sharing a video or watching a shared video influences what is shown by the algorithm (TikTok, n.d.-b).

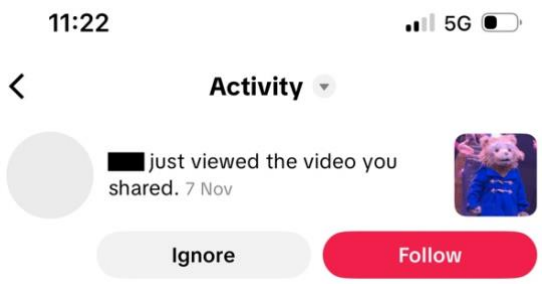

Figure 1. Notification on TikTok to a user when a link they shared is viewed by another user (username and profile photo anonymised)

3.5 Analysis of claims

To analyse the claims made in the video, Google's Gemini was used to generate textual transcripts of the videos. These transcripts were then used to categorise the claims. To ensure the accuracy of the transcriptions, a manual verification process was done by reviewing the original videos and making necessary corrections.

To verify the claims that were labelled as supported, the referenced papers were looked up using Google. The claims were verified by skim-reading the papers and searching for keywords derived from the claims. When there was any uncertainty, such as when the papers were from unfamiliar fields, ChatGPT was asked to identify sections of the paper that could have contributed to the claims mentioned in the video. These sections were then checked in the paper itself to assess the content and determine if it aligned with the original claims.

4. RESULTS

A total of 30 videos were collected for analysis, with 10 videos representing each of the three categories: climate change, AI, and science. The videos were posted between 7 July 2025 and 13 October 2025.

Video durations varied across the dataset, ranging from 5 to 589 seconds. Climate change videos ranged from 5 to 149 seconds, AI videos from 65 to 589 seconds, and science videos from 44 to 419 seconds. Figure 2 shows that the AI-related videos have both the highest median duration and the greatest variability in length, while climate change videos tend to be shorter and more tightly clustered.

The overall median duration across all videos was 112.5 seconds, which is somewhat longer than the typical format currently seen on TikTok, where videos tend to be under a minute (Klug et al., 2021). Surprisingly few videos were part of a series. In the AI category, three videos belonged to a series, compared to only one in the science category and none in the climate change category. This suggests that even though these videos tend to be longer than typical TikTok content, they are not being cut into multiple parts. A possible reason for this pattern is that, as TikTok (n.d.-b) states on its website, "neither follower count nor whether the account has had previous high-performing videos are direct factors in the recommendation system." Since it is not guaranteed that viewers will come across the next part of a series, creators might upload the video in full, making it more concise.

View counts, recorded on 13 October 2025, ranged from 5,271 to 14.8 million, with a median of 309,750 views. Across the three categories, view counts varied

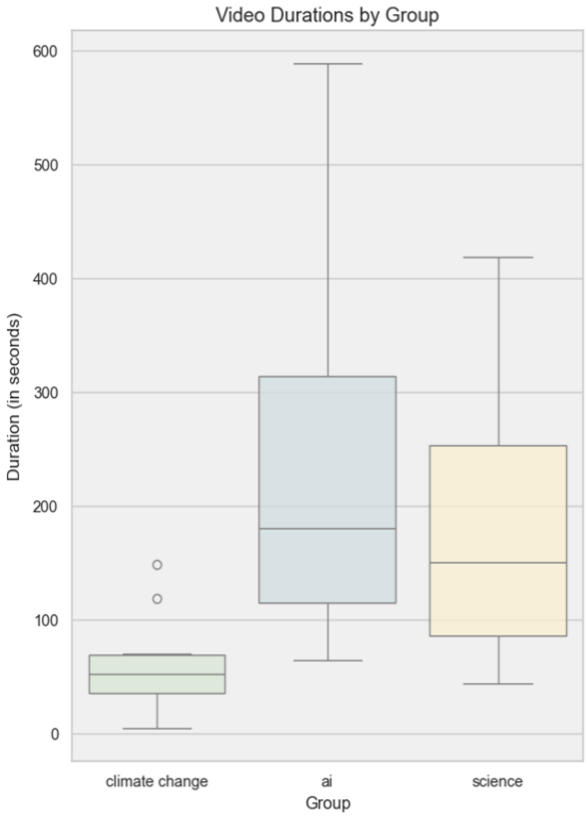

Figure 2. Video Duration by group.

considerably. Science videos received between 51,700 and 5,900,000 views, with a median of 749,700. Climate change videos ranged from 5,271 to 427,200 views, with a median of 55,250. AI-related videos showed the widest variation, ranging from 23,800 to 14,800,000 views, and had a median of 524,000. Taking these findings together shows how the topics attract different viewer numbers.

As shown in Figure 3, differences in like-to-view ratios are evident across all content categories. Notably, the climate change category exhibits the highest average like-to-view ratio, while the scientist category shows the lowest median engagement ratio. Additionally, all the means are higher than the favoured 10%. An ANOVA test conducted on the like-to-view ratios yielded an F-statistic of 4.46 and a p-value of 0.021, indicating a statistically significant difference in mean engagement across categories. With 10 videos per category, the analysis was sufficiently powered to detect meaningful differences in engagement, suggesting that the observed effect is unlikely to be due to random variation alone.

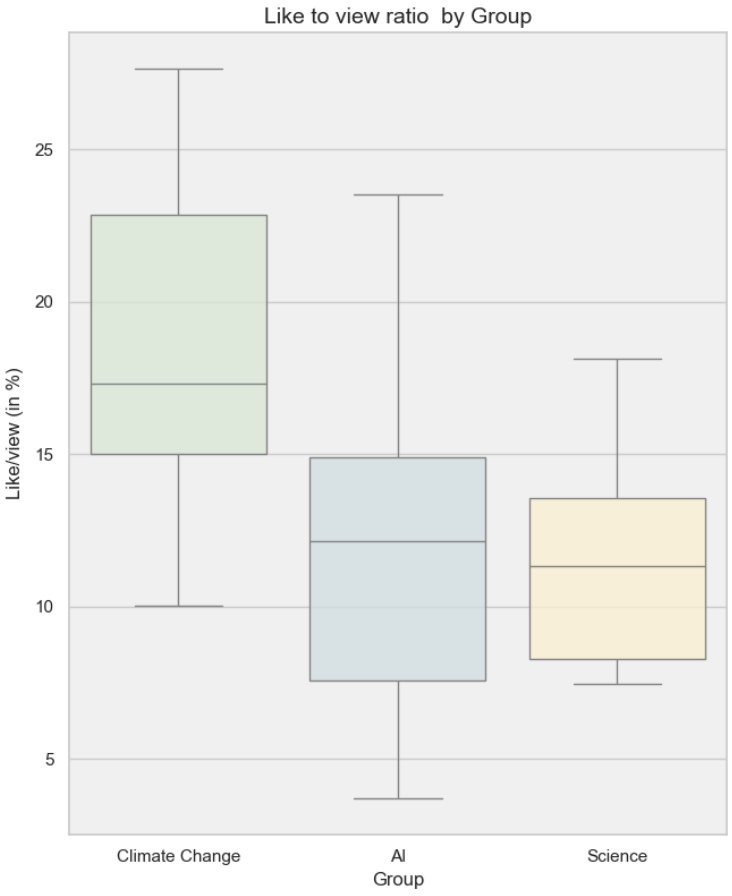

Figure 3. Like-to-view ratio across categories.

RQ1. How does the representation and communication of science differ between professional science communicators and amateur creators on TikTok?

The science category showed the strongest presence of scientists making videos about science, with five out of ten creators identified as scientists, no journalists or laypersons, and five accounts coded as other. All five scientists displayed formal credentials (PhD or Dr.) in their profiles, and only one video included an explicit credibility statement saying, “as a scientist…”. The AI category presented a more mixed distribution: three creators identified as scientists, two as journalists, three as laypersons, and three labelled as other. In this case, there are 11 individuals identified, since one video was an interview between two people, and therefore, both were coded. Finally, the climate change category had the least representation of scientists, with only one scientist identified, no journalists, one layperson, and eight accounts classified as other. Only one creator in this category displayed credentials, and none used persuasive credibility cues.

Overall, this shows that professional scientific representation was most prominent in the science category, followed by AI-related content, and least visible in climate change videos, where amateur and organisational accounts predominated. Across the three topic categories, a clear difference was observed in how science was represented by scientists versus non-scientist creators. An interesting observation across all identified scientists in the dataset is that two creators appeared wearing lab coats and in a lab setting; both of whom were in the science category, as shown in Figure 4.

These results indicate that the science category has the highest representation of scientists who are visibly showcasing their credentials. In contrast, scientists are less prevalent and less visible in the other categories within the dataset.

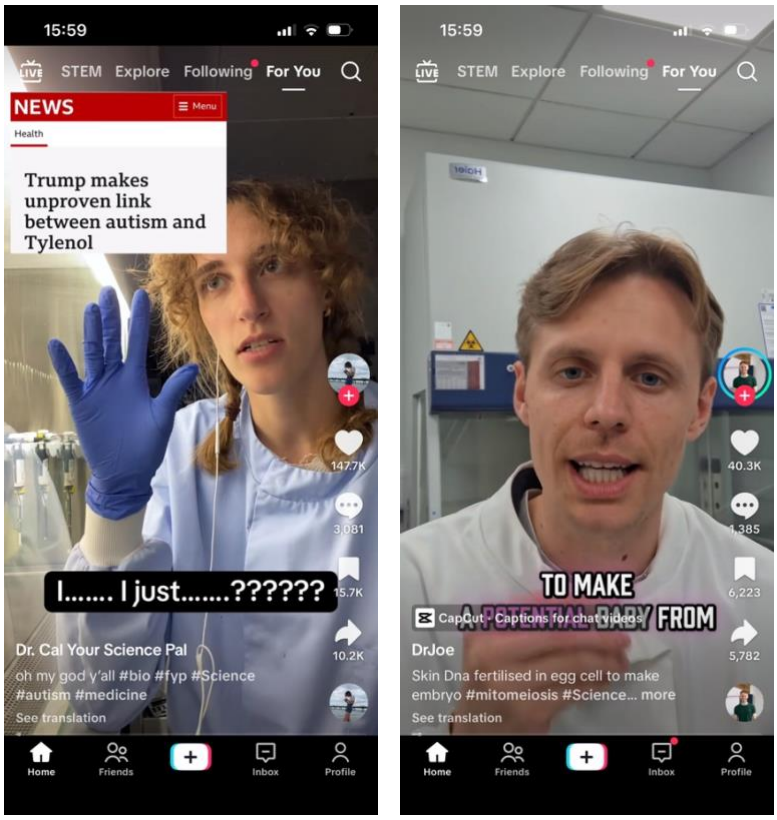

Figure 4. Examples of scientists presenting themselves in lab coats on TikTok.

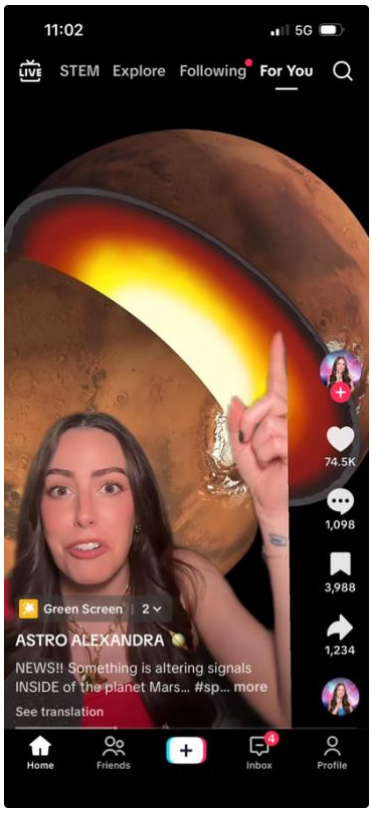

Figure 5. Combination of a person in front of the camera with a green-screen animated background to illustrate what they are talking about

RQ2. What communication strategies and narrative techniques (e.g., storytelling, humour, or framing) do creators use in their TikTok videos?

The use of engagement cues (likes, comments, and shares) was minimal across all categories. The science and AI categories showed the highest, though still limited, use of them: science videos included one comment prompt and two follow prompts, while AI videos contained two comment prompts and two follow prompts. The climate change category showed the least engagement prompting, with only one share prompt and one follow prompt, and no mention of asking for likes or comments. Overall, creators rarely used engagement cues despite their role in increasing a video's visibility on TikTok.

A neutral or formal tone was the most common across all videos, appearing in five climate change videos, five AI videos, and four science videos. Excitement and relatability were the next most frequent tonal elements: excitement occurred in two science videos and one climate change video, while relatability appeared in two science videos and two climate change videos. Urgency was present to a lesser degree, appearing in two AI videos and once in each of the climate change and science categories. Fear-based framing was used sparingly, occurring in two AI videos and one science video. Humour was the least represented tone, appearing only in two AI videos and not at all in the climate change or science categories. These patterns indicate a strong reliance on neutral or formal delivery styles, with emotional or narrative-driven tones, such as fear, playing a comparatively minor role across topics.

Narrative and informational structures were used more often. The claim-evidence format was the most frequent, appearing in six AI videos, eight science videos, and five climate change videos. The problem-solution structure occurred once in science videos, five times in climate change videos, and twice in AI videos. The question-answer format was less commonly used; it appeared once in the science category, twice in AI videos, and was absent in the climate change category. This shows that creators most often relied on structured informational approaches, particularly the claim-evidence format.

RQ3. How are visuals, sounds, and editing styles used in TikTok videos about scientific topics?

Surprisingly, only one popular song was used across all videos in the data set. This was in the climate change category. The song was Old Man by Neil Young, which has over 100,000 videos under that sound alone (as of December 2025) (Neil Young Archives - Old Man TikTok, n.d.). Even though the use of popular songs is one of the main features on TikTok, this was hardly used in the selected data.

Across all categories, ambient sound was the most frequently used audio element. It appeared in five science videos, four climate change videos, and two AI videos. Voice-over narration was less common overall, occurring in two climate change videos and in one video each in the AI and science categories. Silence did not occur in any of the sampled videos. These patterns indicate a preference for background audio, with ambient sound being on top, having more deliberate sound design features, such as voice-overs or music, used more selectively by creators.

In terms of visuals, creators primarily appeared in front of the camera (in second-person view), making this the most common visual format. This style was used in eight climate change videos, eight AI videos, and seven science videos. Animated videos were the second most frequent visual feature, appearing in four science videos, three climate change videos, and two AI videos. Podcast-style clips were the least represented, occurring only once in the science category and not appearing in the other categories. Overall, the results show a strong reliance on the second-person view presentation, with animation used more selectively and podcast-style formats appearing only once.

Some videos combined formats. Three videos in science had both a person in front of the camera and animation, either by split screen or an even amount of screen time. One video in the climate change category also included this combination. Figure 5 shows a combined format of a creator in front of the camera with an animated background.

Next to how a person was shown in videos, inlays were often used. B-roll photos or videos were the most common editing elements, appearing in seven climate change videos, seven science videos, and four AI videos. Schematics were the next most frequent, used in five science videos, two AI videos, and one climate change video. Text inlays were also widely used, occurring in five climate change videos, four science videos, and one AI video. Illustrations appeared with similar frequency, included in three climate change videos, three science videos, and two AI videos. Analogies were the least common editing technique, used in four science videos, two climate change videos, and absent entirely from the AI videos.

Only six videos were solely the person on screen, with no inlays at all, not even closed captions. This occurred in four AI videos, one climate change video, and one science video.

Overlay elements were widely used across all categories. Text overlays appeared nine times in climate change videos and eight times in AI videos, making them one of the most consistently applied editing techniques. Image or video overlays were similarly common, occurring in eight climate change videos, eight science videos, and four AI videos. This shows a strong reliance on on-screen visual reinforcement, with creators frequently integrating additional images, clips, or text to supplement their primary footage. In most cases, the text inlays consisted of closed captions, appearing 18 times across the 30 analysed videos. Showing that most creators use this feature to reach a wider audience.

RQ4. How accurately is scientific information represented in TikTok videos? How are references to scientific content and researchers handled? And what forms of simplification or distortion of information occurs?

Accuracy of scientific claims was assessed by analysing statements in each video that referred directly to the topic or to scientific concepts. Claims were categorised as: unsupported, partially supported, or supported based on whether, in the video alone, the claim was backed up by a study. Whether it was in alignment with established scientific knowledge was left out of the assessment, so even if something is considered factually and scientifically accurate and accepted, without a source, that claim was still considered unsupported. Textual transcripts were generated using Google's Gemini to make the coding process smoother and more accurate.

The AI category contained the highest number of total claims, with 107 claims coded as unsupported, 12 as partially supported, and 5 as supported. The science category followed, including 91 unsupported claims, 38 partially supported claims, and 21 supported claims.

The climate change category showed the smallest number of total claims, with 59 classified as unsupported, 17 as partially supported, and 22 as supported.

No video met the criteria for a strongly supported claim, which would require clear verbal citation of specific papers, journals, or named researchers. Across all categories, references to scientific work were generally vague; "studies" or "researchers" were mentioned, but without identifiable details.

Supported claims were unevenly distributed across videos within each category. In the science category, six videos contained supported claims, with individual videos having twice 1 supported claim, two videos had 2 supported claims 2, one video 7 supported, and one video 8 supported claims. The climate change category included four videos with supported claims, ranging from 1, 2, 5, and one video containing 14 supported claims. The category with the fewest supported claims was AI, where only two videos contained any supported claims, with counts of 1 and 4 per video. Not all references were equal: if the claim was supported by a news article with a visible source, it was considered partially supported; however, news headlines without visible sources were considered unsupported.

References to scientific sources varied across categories. The science category contained the highest number of references to scientific papers, with seven instances identified. The climate change category followed with six references to papers, while the AI category included only one. Beyond formal scientific citations, creators relied more heavily on informal or indirect reference types. Mentions of individual names to back up a claim were most common in the science category (10 instances), followed by AI (8), and did not appear in the climate change videos. References to webpages or blogs, such as news articles, were also most prevalent in science videos (9 instances), followed by AI (4) and climate change (2). Other or unclear reference types occurred 10 times in climate change videos, 7 times in science videos, and once in AI. Overall, informal references were far more frequent than direct citations of scientific literature across all categories.

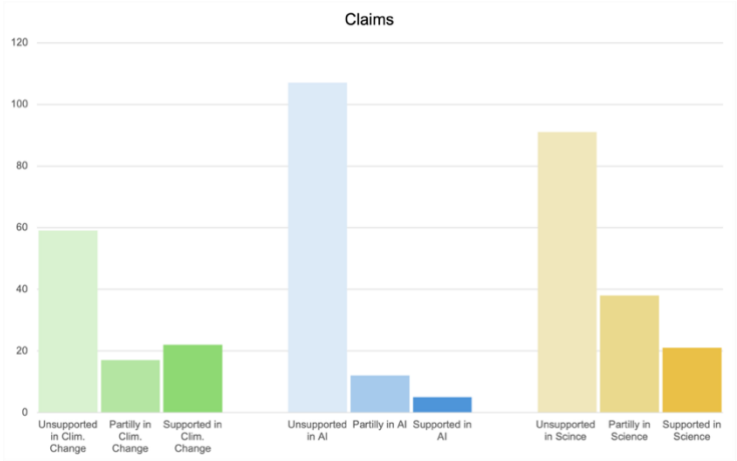

Figure 6. Type of claims per category.

Videos were analysed to identify instances where specific academic papers or formal scientific references were mentioned or visually displayed. This analysis aimed to determine the forms of simplification or distortion of information that occurred. The cited material was retraced and reviewed to assess whether the claims in the video accurately reflected the content of the original source. All references were able to be found and did exist.

Only references that clearly pointed to an identifiable scientific publication were included in this analysis. Mentions that consisted solely of news headlines or general article titles without an identifiable source were classified as not supported claims and excluded from further verification, as their original scientific basis could not be reliably established.

Across the dataset, the number of identified scientific references varied by category. In science content, several videos displayed one or more academic papers on screen: one video referenced three papers, another referenced a single paper, and one video discussed a published warning in Science, displaying the headline and naming the warning. And two videos referenced each to a different paper. In the climate change category, one video displayed six academic papers on screen. In the artificial intelligence category, one video referenced a single paper.

Climate change video

ttCC_24: In this video, six scientific references were noted, with a total of 14 claims. Ten of these claims used scientific references and were reviewed, while an additional two government reports were used for three claims. These claims and reports were also checked, as they are of a scientific nature.

The first claim states: "*The West Coast has an oceanic climate. This is a bioclimatic zone that is moist and mild.*" This is supported by Ellis (2016), as referenced in the video. While Ellis doesn't use the exact phrasing, the claim remains factually accurate, as in the paper, it

discusses concepts like hygrothermy and the Atlantic coastline.

The next claim made in the video states: "*By definition, it has more than 2,000 millimetres of annual precipitation, wet summers, and Julys are cooler than 16 degrees Celsius*." A snippet of a scientific paper by Alaback (1991) is shown in the video. In Alaback's paper, the temperate rainforest climatic zone is defined as having greater than 1,400 mm of annual precipitation, including summer precipitation, and cool, frequently overcast summers with a July (or austral January) isotherm <16°C. The paper does not mention 2,000 mm, and while this is higher than 1,400 mm, its use in the video may exaggerate the data. The July temperature threshold is correctly stated. Interestingly, Swetnam (2025) cites 2,000 mm in a related context, suggesting the video's creator may have mixed sources.

Another claim states: "*It [Gulf Stream] brings warm, moist Atlantic air which collides with the colder air front resulting in so-called frontal rain*." Referencing by showing the title of Kendon et al. (2023) paper on screen. Kendon et al. note that in 2022, the majority of rainfall days were due to widespread frontal rain from Atlantic weather systems, but the paper does not explicitly describe the Gulf Stream's role. Thus, the video extends beyond the specific content of the source.

The video further claims: "*Many of these species only live in ancient temperate rainforests like tree lungwort and are exquisitely sensitive to air pollution from human sources,*" citing Ellis (2016) again. In the paper, it is explained that species such as tree lungwort (Lobaria pulmonaria) are strongly associated with temperate rainforests and long-established woodlands, but they do not occur exclusively in these habitats. While air pollution and human disturbances influence their distribution, the paper does not describe these species as "exquisitely sensitive." Instead, it emphasises that climate, woodland continuity, habitat extent, and pollution together determine species distribution.

The next claim states: "*Biodiverse plant communities support a resilient animal community, including some very charismatic guys like pine martens, the pied flycatcher, red squirrels, and some very cool insects. As well as less flashy insects, snails, and earthworms*." citing Swetnam (2025) by showing a screenshot of the paper's title on screen. The paper mentions the pied flycatcher and insects such as the chequered skipper butterfly thriving in temperate rainforest, but other animals named in this claim were not. Thus, the claim overstates the evidence a bit, though the pied flycatcher and certain insects are accurately represented.

The claim after that: "*Decline of temperate rainforest in the UK has been slow, but it began at the end of the Neolithic, the Stone Age*", referencing Raum (2020) on screen. This aligns with the paper, which states: The continuous expansion of human populations and their livestock since Neolithic times led to substantial forest decline.

The person in the video then claims: "*If you look at government reports, you'll see that the forest cover in the UK has increased in the last century. But this increase is mostly due to monocultures that are largely used for timber production,*" citing Raum (2019) on screen. The claim is accurate, as the paper explicitly states that 20th-century land-use decisions "had major effects on the landscape… constraining it until today," and highlights the role of timber production.

"*Now only fragments of our ancient rainforests remain. Threatened by diseases, invasives, too many grazing animals due to a lack of predators, excess nutrients, little connectivity between rainforests, and a climate crisis with uncertain climatic effects,*" was said while Keepers of Time: Ancient and Native Woodland and Trees Policy in England, 2022 was shown on screen. The report confirms the claim. It supports the view that ancient woodlands are now fragments and specifically lists diseases, invasive species, grazing, pollution, and climate change as key threats.

The next two claims were made while showing the Woodland Management Matters: Ensuring the Future Health and Resilience of Our Woodlands, 2024, on the screen. Firstly, the creator in the video says, "*Forestry can be regenerative, focusing on natural processes and natives*." This report is about how sustainable management ensures woodland health, and it specifically mentions "By mimicking natural processes, you can support nature" and emphasises the protection of native species by explicitly advising landowners to manage and remove "invasive, non-native plants" so that native plants can flourish. Therefore, this report supports the claim.

"*And agroforestry enables farmers to benefit from biodiversity whilst still making money and supporting our population"*. The report specifically mentions that agroforestry "combines trees and shrubs with crop and

livestock farming systems" to provide "increased farm productivity" and "supporting nature"; this supports the claim.

In short, the creator did an excellent job backing its claims with scientific and government sources. Most claims were accurate, and references were clearly shown, making this by far the best example of well-supported, credible content in the data set.

AI video

ttAI_20: The paper discussed in this video is about the new TRIBE model that Meta researchers have been working on. The video references a paper by d'Ascoli et al. (2025). Even though the title is not shown, parts of the paper appear on screen, and images from it are also used in the video. Four supported claims were identified in this video.

The video starts with: "*...with scientists at Meta just unleashed TRIBE, an AI that can literally read your mind in real time*." While it is true that scientists at Meta developed TRIBE, describing it as "reading your mind in real time" sensationalises the actual science. The paper describes an encoding model, meaning it predicts what brain activity will look like when a person watches a specific stimulus, such as a video, rather than directly reading thoughts.

The next claim: "*They built this AI model called TRIBE that learned about brains by binge-watching hours of TV shows and movies. Just watching. It was processing the audio, the subtitles, the visuals, all at once. Just like how we do in real life.*" Claiming that the AI "learned by binge watching TV just like we do" simplifies the reality. In practice, the researchers used three separate, frozen models to process the different types of input. The video shows a figure from the paper and says: "*They made this 3D map of our brains while it is working. So red areas process words, green is for audio, blue is for visuals*." The description that goes along with the claim shown in the video is partially accurate. The speaker correctly notes the colour-coded brain areas, which align with the paper's findings on brain mapping.

The video ends with: "*And in the paper, the researchers said they have not found the limit yet. More data makes it exponentially better*." While the authors of the paper do suggest that performance continues to improve with increasing amounts of data, they do not claim exponential gains. Instead, they discuss that their results indicate consistent improvements with additional data, suggesting that the limits of the model have not yet been identified.

Overall, this video accurately represents the findings of the papers and supports the claims with the references, but some descriptions were slightly simplified.

Science videos

ttS_3: This video presents three scientific papers and focuses on disproving the White House report "FACT: Evidence Suggests Link Between Acetaminophen, Autism" (The White House, 2025). In the video, the creator uses the evidence cited in the report by the White House and challenges its conclusions by going over the references that are used in the report. The White House statement appears to have been updated since the TikTok was posted on 24th August 2025 (Figure 7), with the updated version observed on 10th December 2025 (Figure 8). While there are slight differences in wording and formatting between the TikTok screenshots shown in the video and the current version of the White House webpage, the linked studies discussed remain the same. For this analysis, the video is therefore assumed to be responding to the same report.

For this video, eight supported claims were coded. Three of these claims use screenshots from news articles. The remaining five claims use academically cited sources shown in the video, and these will be reviewed here.

The first claim addressed in the video is: "*The studies listed here do not make any conclusive causal link*

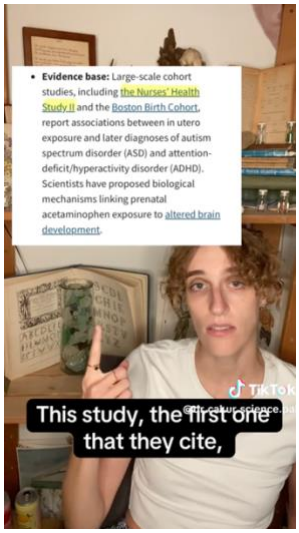

Figure 7. Statement from the White House in the TikTok video.

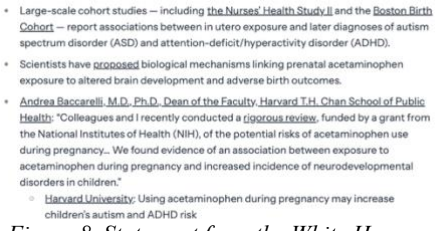

Figure 8. Statement from the White House on their website.

between acetaminophen use and autism. This study, the first one that they cite, it is not even about autism. It is about ADHD, and I know that because I read the title." Clicking the Nurses' Health Study II hyperlink leads to the study shown in the video, which is by Liew et al. (2018). This study indeed focuses on ADHD rather than autism, as indicated in the title, supporting the speaker's claim that the study does not directly investigate autism.

The speaker then moves to the second hyperlink in the White House report, the Boston Birth Cohort, showing a screenshot of the study titled "Association of Cord Plasma Biomarkers…" by Ji et al. (2020), and states: "*This study measures acetaminophen exposure based off its presence in umbilical cord blood after birth. But the half-life of acetaminophen is only three hours. So, this study (the one from Ji et al.) as conducted has no way of determining whether or not the pregnant person took acetaminophen every day throughout their pregnancy or just in the three hours before the baby was born*." This point is reinforced by showing the study's limitations section, which explicitly discusses the constraints imposed by acetaminophen's short half-life. The paper shown is also the one referenced by the White House hyperlink and is correct. Additionally, the claim is also correct with what is in the paper.

The next claim is about the Baker et al. (2022) paper: "*The one that the scientists actually performed? The one that the HHS is putting forward as evidence to support their claims. Autism is not on the list of adverse effects that they actually investigated*." In the video, a screenshot of the "Objectives" section of the paper is shown. This is true; it is on the first page of the paper. The paper does, however, mention autism in the Introduction part, but to mention that other studies have concluded that it can be a cause due to other factors.

The next claim is: "*Each of these studies has a long list of confounding variables that they controlled for as best they could when they were examining these pregnancies, i.e., other things that could have happened during the pregnancy that could have led to autism. But you know what they do not control for? You know what they didn't check for in either of the parents of these children? AUTISM.*" While discussing this, an inlay shows a scrolling list of variables, including marital status, maternal educational level, maternal stress, smoking, etc., from the paper. Checking the paper confirms that the section shown is accurate, and autism is not in that list.

The person in the video effectively used the studies cited in the White House report to challenge its claims by showing the actual papers and evidence.

ttS_7: The video shows a screenshot of a blog post from the University of Hawai'i. This screenshot corresponds to an existing article (University of Hawaii News, 2025). In the video, the following claims are made: "*Well, there's recent research published that suggests that the contents of our universe has sort of a net rotation to it."* The video then states: "*So in this study, it observed several hundred galaxies from the best observing directions you can come up with, which is above and below the plane of our Milky Way. And it noticed a net rotation of spiral galaxies in one direction versus the other*."

To verify this claim, the first hyperlink in the article leads to the original study by Szigeti et al. (2025). However, neither the study nor the University of Hawai'i news article states that several hundred galaxies were directly observed. Instead, the article explains that "*Szapudi's team developed a mathematical model of the universe" and that "their model suggests the universe could rotate once every 500 billion years*." As a result, the video misrepresents the research by reframing a theoretical, model-based result as direct observational evidence.

This video simplifies the research too much, presenting speculative, model-based findings as if they were solid, proven results.

ttS_10: This video was about homochirality. The only reference explicitly made occurs when the speaker mentions the dangers and that "*A group of 38 scientists, including Nobel Prize winners, publish a warning in Science*" and shows the Technical Report on Mirror Bacteria: Feasibility and Risks by Adamala et al., 2024, as shown in Figure 9. While the report was authored by 38 scientists, including Nobel laureates Jack W. Szostak (Nobel Prize in Medicine, 2009) and Sir Gregory Winter (Nobel Prize in Chemistry, 2018), the report that is shown in the video has not been published in Science. The same group has, however, published a warning on the same topic in Science (Adamala et al., 2024).

Therefore, although related, the report shown in the video is not the Science publication.

The difference in what is shown and what is said gives a subtle distortion. By presenting the technical report alongside the claim of publication in the journal Science, the video simplifies and exaggerates the authority and immediacy of the material, potentially misleading viewers about the official status and impact of the research. While they are still related to each other, it is important to show them correctly, with what is said in the video.

ttS_18: This video discusses the potential discovery of ancient life on Mars and refers to statements made by NASA, without citing other authoritative sources. Midway through the video, a scientific paper by Hurowitz et al. (2025) is shown, and the speaker claims: "*There are ways to produce these spots without biological reactions—things like sustained high temperatures, acidic conditions, and binding organic compounds. But there's no evidence of any of that happening here*."

The claim that non-biological mechanisms, such as sustained high temperatures, acidic conditions, and the binding of organic compounds, could produce the observed features matches the explanations in the study. However, the statement "there is no evidence of any of that happening here" is only partly correct. The paper rules out sustained high temperatures and very acidic conditions, but it does so based on mineral evidence, such as the presence of gypsum and vivianite, which suggests low temperatures and moderate pH instead. The video simplifies the study's conclusions by making it sound like all non-biological explanations are fully excluded, which the paper does not claim.

ttS_21: This video is about how NASA found giant "lumps" of ancient rock buried deep inside Mars that have been stuck there for 4.5 billion years. At the end of the video, a paper by Charalambous et al. (2025) is on screen for the last 3 seconds as the background while the maker of the video says: "*But we actually also have been hit by a giant object and also have lumps inside of Earth, in a different way. But this is super cool research*."

The paper says: "A giant impact from a large, differentiated projectile, as proposed for Earth (7), would initially produce either regional or global heterogeneity" and also: "On Earth, ancient mantle heterogeneities,

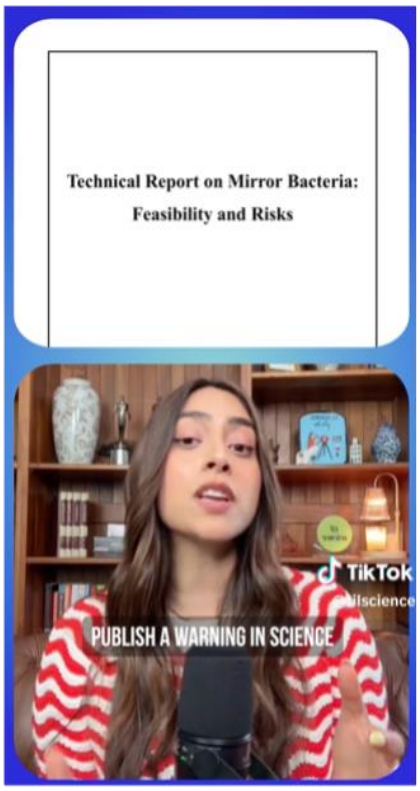

Figure 9. The Technical Report shown in the TikTok video.

identified through the isotopic signatures of lava erupted at hot spot volcanoes and fed by mantle plumes, may be remnants of an early magma ocean or core-mantle interactions." But the next sentence is: "However, widely distributed passive mantle heterogeneities are unlikely to have survived 4.5 billion years of convective stirring". It appears more like the paper is suggesting it could have been on earth but more as a suggestion, not as a harsh fact as stated in the video. This video draws on real scientific research, but it simplifies and exaggerates the findings. While the cited paper suggests Earth might have ancient mantle heterogeneities, the video presents this as more certain and dramatic than the research supports, turning model-based results into facts.

Across the analysed videos, simplification and distortion mainly occurred through exaggeration, selective use of findings, and claims going beyond what the cited sources actually state. In many cases, the claims were broadly based on scientific literature but were presented in stronger, more certain, or more dramatic terms than the original research supports. This included overstating numbers, causal claims, or the strength of evidence. As well as presenting complex or model-based results as clear observational facts.

5. DISCUSSION

5.1 Interpretation and Theoretical Implications

The findings of this study demonstrate that science on TikTok is communicated through a combination of narrative simplification, visual emphasis, and use of credibility cues. Both professional scientists and non-scientist creators contribute to science-related content on the platform; they do so in different ways. Looking at different content categories, the science category had the strongest presence of scientist showing formal credentials, by either wearing a lab coat or more prominently having titles in their bios and name. In contrast, the climate change and AI categories were mostly dominated by laypersons and organisational accounts rather than identifiable scientists. This suggests that while the science category is a space where experts actively display their authority, topics like AI and climate change are shaped more by a mix of voices. In these areas, formal scientific identity is less central than in topics across the dataset.

These findings suggest that visibility on TikTok is shaped less by scientific authority and more by how information is communicated. This aligns with existing research indicating that algorithmic systems prioritise engagement over epistemic accuracy (Boeker & Urman, 2022; Klug et al., 2021). As a result, scientific content that simplifies complex topics is more likely to achieve wide circulation, even when nuance is reduced.

Across all categories, creators relied on storytelling techniques such as problem-solution structures, question-answer formats, and claim-evidence narratives. These formats helped audiences engage and understand, but often made scientific knowledge seem more certain than it really is. This supports earlier research showing that in digital spaces, stories that are clear and emotionally engaging often matter more than strict accuracy (Cho et al., 2024). As a result, the uncertainty that is normal in science was often reduced or left out. Visual and audiovisual elements played a role in shaping how credibility was constructed. Features such as green screen use, screenshots of academic papers, and being direct in front of the camera functioned to signal the legitimacy of claims. As in many cases, these visual cues appeared to substitute for deeper engagement with scientific evidence, reinforcing the idea that credibility on TikTok is often performed rather than demonstrated. This supports existing research suggesting that platform-specific visual conventions strongly influence perceptions of authority and trustworthiness (Kanthawala et al., 2022).

While most of the scientific claims shared in the videos in the dataset were not supported by any references at all, the videos in which the claims were supported overstated results sometimes, selectively present findings, or removed important contextual nuance, as in the case of model-based results.

Overall, this shows that simplified content can still be grounded in science, even if some details are exaggerated or missing.

5.2 Societal and Regulatory Implications

While short-form videos make science more accessible, the scientific information shared in the videos often requires interpretation by scientists. This raises concerns about how people judge scientific credibility. When trust is based on visuals rather than evidence or method, it becomes harder to tell strong research apart from convincing but weak claims, especially on platforms that prioritise engagement over accuracy. Misinformation on social media is already widely studied, this research emphasises the need for a structural approach to regulating scientific communication on TikTok. The main challenge lies not only in false content but in how algorithms and engagement metrics shape visibility and perceived authority on apps like TikTok.

This study relied exclusively on openly available content. All analysed videos were publicly accessible at the time of analysis. As of January 8th, 2026, all links to the videos have been checked and are still publicly available on TikTok, besides 1 video in the AI category.

The study adheres to the master programme's guidelines for ethics and data safety.

5.3 Limitations and Future Research

This study only analysed videos in English. For each category, a sample of 10 videos was used. While larger samples could potentially provide more insights, the current sample size was chosen to balance feasibility and the risk of overfitting. Additionally, the analysis was done by a single researcher, who was applying a grounded research approach for the first time.

It is important to note that the use of ChatGPT as part of the research process in the analysis of the supported claims has its limitations. Despite being used cautiously

and with continuous verification of responses, reliance on such tools comes with limitations, as their responses are not fully reliable and may influence the interpretation of the results.

The dataset represents only a snapshot in time rather than a comprehensive overview of science communication on the platform since the videos were found by using the algorithm. TikTok's algorithm functions as a black box and is constantly evolving. Its reliance on algorithmic curation means that replicating a dataset with the same characteristics may be difficult, as trends, content types, and user engagement can shift rapidly. Videos available at the time of this study may differ significantly if the same search or hashtag queries are conducted in the future, potentially affecting the comparability of future research. Future research could expand this work by examining a larger and more diverse dataset or using it for other topics besides the three done in this thesis.

Comparative studies across platforms such as YouTube Shorts or Instagram Reels could further illustrate how these platform designs influence scientific communication styles in short-form video content. Audience focused research could be done to look at how users interpret credibility cues and how these interpretations affect trust in science online. For example, analysing the video comment section with creator-audience interaction, which could offer further insights into content interpretation of users on TikTok and its information exchange.

5.4 Concluding Reflection

This study shows that TikTok has become a space for encountering scientific information while scrolling, where the platform's visibility algorithm and visual performance shape how knowledge is communicated. While the platform makes science more accessible, it also encourages simplification that can hide uncertainty and complexity that are often present in scientific literature.

On TikTok, visual cues such as screenshots, captions, and green-screen effects functioned as substitutes for traditional science citation, creating a platform-specific logic of credibility. Pointing at a screenshot or using the green screen may be used as a platform-specific standard for citing sources. Although most content does not present as misinformation, the removal of nuance shows the tension between accessibility and accuracy.

Ultimately, understanding how scientific knowledge is shared on platforms like TikTok helps people better understand and engage with information and science communicators on what to do when sharing information on TikTok.

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