Science Communication Under Post-Truth Conditions: The Drowning Effect in a YouTube Live Micro-Public

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Abstract: Post-truth conditions describe communication environments in which facts alone rarely stabilise public interpretations; judgments are shaped by affect, group identity, and ideological alignment. In such environments, science communication becomes more difficult because trust is continuously renegotiated and discussions are vulnerable to topic displacement. Lee et al. (2020) term this displacement the drowning effect, in which the primary message is pushed aside as attention shifts to more salient adjacent frames. Research on science communication under post-truth conditions has rarely examined live, platformised broadcasts, where audience re-framing is coupled to the broadcast and can be observed as it unfolds. YouTube Live is analytically valuable because it combines an authoritative narrative with a real-time comment ecosystem, enabling to track when and how audience frames diverge from communicator frames within a single event. We use a comparative single-case qualitative design and apply qualitative content analysis to a 4-hour-and-37-minute YouTube Live watch-party about Türkiye's first crewed space mission (18 January 2024), hosted by ten Turkish science communicators. We analyse the broadcast transcript and the associated user comments (including replies). We operationalise the drowning effect through (a) systematic divergence between broadcast framing and commenters' framing and (b) a high prevalence of off-context, opinion-dominant, and polarising contributions. Findings indicate sustained divergence between broadcast framing and the commenters' framing: while the broadcast foregrounded scientific rationale and mission operations, commenters frequently recontextualised the event through legitimacy contestation, distrust, and interactional noise. Overall, the conversation moved away from sustained technical engagement and toward audience-led reframing, in ways consistent with a drowning effect. Findings suggests that on YouTube Live, the commenters can quickly take over and pull attention away from the science message, so science communicators need to treat live streams as two-layer events and plan framing, moderation, and trust-building accordingly.

Keywords: Science Communication, Post-Truth, YouTube, User Comments, Drowning Effect, Space Mission

1. Introduction

Digital platforms host a large share of contemporary science communication, allowing scientific events to reach wide publics in real time (Mandl et al., 2023). On platforms, however, meaning is not simply transmitted by experts; it is negotiated interactionally, particularly in comment sections where audiences interpret, contest, and redirect messages (Kubin et al., 2024). Comments therefore function as public sense-making spaces in which scientific frames may be reinforced, re-framed, or displaced as competing priorities gain visibility (Scharlach & Hallinan, 2023).

YouTube Live is a productive setting for studying these processes because it combines an authoritative broadcast narrative with real-time audience participation. Communication unfolds across two coupled layers: the narrative constructed by hosts and speakers, and a comment ecosystem through which viewers endorse, challenge, or re-prioritise that narrative. The salience of frames is also shaped by platform affordances and attention dynamics (Scharlach & Hallinan, 2023; Walter & Friesike, 2025).

These dynamics are especially pronounced under post-truth conditions, where affect, interests, and identity alignment shape public opinion more strongly than verified facts (Oxford Languages, 2016), and claims are often judged through emotion and perceived intent rather than evidence (McIntyre, 2018). Lee et al. (2020) describe this displacement as the drowning effect, where audience interaction pulls discussion away from the primary message toward adjacent or unrelated frames. Negative commentary, irony, provocation, and distrust cues can further undermine perceived credibility and reduce sustained engagement with technical explanations (Dobber & Hameleers, 2025; Egelhofer et al., 2024; Kubin et al., 2024).

Against this backdrop, this study analyses a YouTube Live watch-party broadcast hosted on 18 January 2024 by Turkish science communicators about Türkiye's first crewed space mission. This bounded case allows us to examine expert framing and audience re-framing within a single event and to assess when reception shifts away from the science message in ways consistent with a drowning effect.

2. Literature Review

2.1 Science Communication Under Post-Truth Conditions

Post-truth denotes a condition in which affect, interests, and identity alignment outweigh verified facts in public opinion formation (Oxford Languages, 2016; Arencibia & Velázquez, 2022; McIntyre, 2018). In platform environments, ranking and engagement systems can privilege belief-confirming and affective content over accuracy, weakening shared reference points for adjudicating truth claims. In such contexts, science communication must contend not only with informational deficits but also with contested credibility and interpretive polarisation.

On the other hand, science communication supports public engagement with science and technology in democratic life. Science communication shares and discusses scientific processes, outcomes, and implications with audiences. It uses interaction to interpret scientific and technical developments and to discuss issues with scientific and technical dimensions. Core functions include helping publics interpret scientific and technological developments, bringing societal needs and concerns into the conversation, and using communication practices that support active engagement rather than passive reception.

Science communication ranges from one-way transmission, such as informational TV programs, to two-way dialogue, such as sessions that gather public input. Goals vary and overlap, including raising awareness, sharing findings, building understanding, shaping science-related views and behaviour, informing policy preferences, and including public perspectives in science and technology decisions (Koster & Kupper, 2020).

However, science communication faces major constraints under post-truth conditions. Visibility logics and interaction signals shape exposure, trust and legitimacy become relational constructions rather than simple reflections of content (Taddicken, 2026). Analytical focus shifts away from correctness to the interactional conditions framing the message through which claims gain meaning and are repositioned in digital media. Identity alignment and discussion tone, including irony, escalation, and polarization in comment space shape credibility through social signals that sometimes drift from substantive content (Egelhofer et al., 2024).

In platform-based science communication, participatory culture positions audiences as co-producers of meaning through interaction. Likes, comments, and shares shape the direction and tone of engagement through the values users attach to these cues (Scharlach & Hallinan, 2023). Sender narratives and user responses form a dynamic relationship that can influence each other in real time. User comments shape perceptions and evaluations, which makes the comment layer analytically central for science communication (Kubin et al., 2024). Visibility pressures also shape content strategies, so maintaining a scientific narrative depends on platform interaction and visibility conditions (Walter & Friesike, 2025).

In platformised environments, comment ecosystems shape which frames gain prominence and which debates become central. Reviews of news-related comments show that comments influence perceptions, steer discussion, and reframe audience relationships with content (Kubin et al., 2024). Comments therefore constitute a core element of public reception. In live, co-hosted broadcasts, participation is highly visible and clusters quickly, which intensifies frame competition and makes reception-level reframing easier to observe (Wu & Cui, 2025; Montes et al., 2025).

Live streaming intensifies these dynamics because comments appear in real time and clusters form quickly. On YouTube Live, science communication involves message delivery and the interaction processes that stabilize, reframe, or displace messages (Walter & Friesike, 2025). Platform conditions, including comment ordering, like and reply visibility, and moderation signals, accelerate some frames and steer the reception agenda (Hosseinmardi et al., 2024).

2.2 The Drowning Effect in Micro-Communities

Platforms broaden access to scientific knowledge, yet public discussion does not necessarily retain scientific and technical frames as organising priorities. Commenters may shift away from a creator's primary message and build alternative narratives that displace the original intent (Lee et al., 2020). Lee et al. (2020) describe the drowning effect as topic displacement in comment threads: discussion moves from the primary message to adjacent or unrelated issues, often triggered by salient cues, with audience interaction redirecting attention away from the original framing. Commenters drive meaning-making, bypass gatekeeping, and redirect attention away from the original framing (Lee et al., 2020). The pattern often co-occurs with opinion-dominant talk and

polarization, with identity and ideological alignments structuring the debate. Drowned conversations often reorganize around identity and ideological alignments. Partisan attacks and group-based derogation intensify conflict and strengthen in-group and out-group boundaries.

This study uses the concept of the drowning effect to explain message displacement. Gandy & Erzikova's (2017) research defines it as a process in which expanding public talk and side debates overshadow an actor's message rather than directly refuting it. Related work links this pattern to audience-driven gatekeeping in online comments (Lee et al., 2020; Simpson, 2021) and frames drowning as a reordering of priorities through interaction, not misinformation production.

In science communication, the drowning effect emerges when accurate information remains available but loses priority in discussion. Research shows that commenters re-evaluate scientific authority and epistemic credibility, and negative comments reduce perceived expert credibility and shape message evaluations (Nowak & Krämer, 2025; Peters, 2024). Because comments produce measurable reception effects, drowning has perceptual consequences, not only discursive ones (Till et al., 2025). The issue is competing frames. Disorderly and uncivil comment spaces shift attention from scientific content and redirect perceptions of expertise and credibility (Dobber & Hameleers, 2025; Egelhofer et al., 2024).

Micro-publics in comment ecosystems offer a useful context for examining the drowning effect. A micro-public is a temporary audience that forms around a live broadcast and can extend into the reception phase through post-event comments in the same space. High interaction intensity accelerates clustering and makes frame shifts more visible. By comparing scientific and technical frames in the video transcript with dominant comment frames, we can assess how platform interaction displaces scientific meaning (Mandl et al., 2023; Kubin et al., 2024).

2.3 Science Communication on Türkiye's First Crewed Mission

The mission formed part of Axiom Mission 3, a commercial International Space Station (ISS) utilization mission, on January 18, 2024. Axiom Space integrated the mission, SpaceX provided transport to and from the ISS, and NASA oversaw ISS safety and operations interfaces. Alper Gezeravcı served as mission specialist and payload operator. He carried out the on-orbit experiment schedule and joined public engagement activities, including live links and education and outreach. The financial model followed commercial access, procured as a service. Reuters reported Axiom charges at least USD 55 million per seat and Türkiye paid about USD 55 million (Gorman, 2024).

For Türkiye, the mission supported human spaceflight capability building and ISS utilization, including selection and training, payload integration planning, and institutional learning about human-tended research in low Earth orbit. It also triggered dispute about opportunity cost and transparency, including debate around the publicly cited USD 55 million figure. Competing frames, including national science mission and space tourism, intensified this dispute in a polarized media environment. The mission became a prominent agenda item across mainstream and social media. Much of the debate shifted toward non-scientific issues rather than the mission's scientific substance. Hence, the mission became a focal point for public evaluation of scientific investment, institutional credibility, and national aspiration.

Türkiye's first crewed mission also marked a milestone for science communication in Türkiye. Science communicators on digital platforms came together for a joint live watch-party broadcast (Özcan, 2024). The format combined real-time viewing with expert narration, while audiences produced an intensive comment on the same page. The live broadcast lasted four hours and 37 minutes, and ten science communicators participated.

We selected this YouTube livestream and its comment section as a case because it offers a highly visible and traceable venue where you can observe public debate around the mission in an explicit form. Where public debate around the mission is observable in an explicit form.

3. Method

We examined how science communicators framed Türkiye's first crewed space mission and how commenters reframed it in a single YouTube Live watch-party under post-truth conditions.

We used a comparative single-case qualitative design to analyze meaning-making across two coupled layers, the expert narrative in the broadcast and the user comments. We analyzed expert framing (RQ1), commenters'

reframing (RQ2), and cross-layer convergence and divergence, including topic displacement consistent with the drowning effect (RQ3) (Lee et al., 2020).

1. RQ1: How do science communicators construct meaning around the mission through trust-building strategies, legitimation, and identity?
2. RQ2: How do commenters negotiate the same event through trust-building strategies, legitimation, and identity?
3. RQ3: Where do science communicators and commenters converge or diverge in the salience of trust, legitimation, and identity? To what extent do commenters show the drowning effect, defined as topic displacement from mission-related scientific and technical content toward identity conflict?

We built two datasets from the same broadcast episode:

- Video transcript (VT). We transcribed the watch-party to capture the science communicators' narrative, including mission rationale, operational sequencing, and how they mediated technical content for a public audience.
- User comments (UC). We exported N = 1,357 comments and replies using Communalytic (Gruzd & Mai, 2022) on June 4, 2024. After removing duplicates, ads, spam, empty or unreadable entries, and comments made only of links, tags, or emojis, the final UC corpus included N = 1,039 comments.

We applied qualitative content analysis to both datasets and built an aligned thematic architecture to compare expert framing and audience reframing (Maene, 2023). We organized coding around three shared pillars, trust-building strategies, legitimation, and identity (McIntyre, 2018; Reif et al., 2024).

We built a codebook with top-level themes below and iteratively developed the subthemes during coding.

- *Trust-building strategies.* In VT, this theme covers how science communicators made the mission intelligible and credible, including scientific rationale, technical operations and safety, and mediatized explanation for diverse public. In UC, it covers trust supporting responses, such as endorsements and gratitude, and erosion, such as suspicion, denial, and conspiratorial insinuations.
- *Legitimation*. In VT, this theme includes institutional legitimation, participatory broadcasting, and political-economy rationales, including cost, commercial framing, and priorities. In UC, it includes justificatory and contestatory rationales, including cost-benefit disputes and resource allocation claims.
- *Identity*. In both datasets, this theme captures affective positioning and identity alignment, such as national symbolism and we positioning. In UC, it also captures identity conflict expressed through polarizing antagonisms.

In UC, we also coded *noise*, including off-context remarks, trolling, humour and sarcasm, and NA or meaningless entries. We included this category to assess topic displacement and discussion derailment for RQ3.

First author coded the dataset in MAXQDA and drafted the codebook with operational definitions and inclusion and exclusion criteria. Second author then coded the same dataset with this codebook. We compared coded segments, resolved disagreements, and refined code boundaries through discussion until we reached consensus. Krippendorff's alpha was .80, which indicates strong theme-level agreement beyond chance (Krippendorff, 2018). We allowed multiple codes per comment. VT yielded F = 1,903 code applications and UC yielded F = 1,855 code applications.

To answer RQ3, we compared VT and UC theme and subtheme salience. We calculated frequencies and within-dataset percentages, then computed percentage-point differences, VT% minus UC%, to identify where experts and commenters diverged. This approach supports descriptive comparison, not causal inference.

We treated the drowning effect as an observable pattern of topic displacement in UC. We assessed drowning by examining UC codes that shifted attention away from mission-cantered scientific and technical content toward other priorities including: (a) Identity conflict and polarizing political contestation, (b) Disputes framed as political show off or agenda setting, (c) Trust erosion, including suspicion and conspiratorial interpretations, and (d) Noise, including off-context negativity, trolling, and sarcasm, and NA.

We compared VT and UC on the relative salience of the three shared top-level themes, trust-building strategies, legitimation, and identity, using chi-square tests of homogeneity on code-application counts (F). We report Cramér's V as the effect size. Because UC also included a UC-specific top-level category, noise, we focused inferential tests on the three shared themes. We report Noise descriptively and treat it as part of the drowning-effect indicators. We also ran a sensitivity analysis that included Noise as a fourth category and confirmed that the overall VT to UC distributional difference remained robust.

4. Findings

The findings summarize how thematic emphasis differs between the VT and UC for the focal YouTube case. We report (a) the frequency and within-source percentage of each main theme and subtheme in VT and UC, and (b) the VT–UC difference (pp), calculated as VT% minus UC% to indicate relative emphasis across sources in Table 1.

In VT, Trust-Building Strategies is the most prevalent theme (48.5%, *f* = 924), expressed primarily through Technical Operations and Safety (22.4%, *f* = 427) and Mediatization (18.5%, *f* = 353), with Scientific Rationale accounting for 7.6% (*f* = 144). Legitimation is the second most common theme in VT (31.8%, *f* = 604), led by Political Economy Debate (14.0%, *f* = 266) and followed by Legal Legitimation (6.7%, *f* = 127), Participatory Broadcasting (6.5%, *f* = 123), and Social Benefit and Inclusiveness (4.6%, *f* = 88). Identity represents 19.6% of VT coding (*f* = 375) and is concentrated in Identity-Based Alignment (13.4%, *f* = 256) and Affective Reaction (6.2%, *f* = 119), with Identity Conflict absent (0.0%, *f* = 0).

In UC, Identity is dominant (51.2%, *f* = 950), distributed across Affective Reaction (19.0%, *f* = 353), Identity-Based Alignment (16.7%, *f* = 310), and Identity Conflict (15.5%, *f* = 287). Legitimation constitutes 22.3% of UC coding (*f* = 414) and is largely attributable to Political Economy Debate (21.3%, *f* = 396), with limited Social Benefit and Inclusiveness (1.0%, *f* = 18); Legal Legitimation and Participatory Broadcasting are not observed (both 0.0%, *f* = 0). Trust-Building Strategies account for 5.9% of UC coding (*f* = 109) and are composed of Trust Erosion (5.4%, *f* = 100) plus Scientific Rationale (0.5%, *f* = 9), while Mediatization and Technical Operations and Safety are absent (both 0.0%, *f* = 0). Noise constitutes 20.6% of UC coding (*f* = 382), primarily Off-Context and Negative Remarks (13.8%, *f* = 256), followed by Humorous/Sarcastic Approach (4.6%, *f* = 86), Troll Comments (1.9%, *f* = 35), and NA (Meaningless comment) (0.3%, *f* = 5).

Table 1: Distribution of qualitative codes in VT and UC

Main Themes and Subthemes	VT Frequency (f)	VT Percentage (%)	UC Frequency (f)	UC Percentage (%)	VT − UC Percentage-Point Difference
Identity	**375**	**0,196**	**950**	**0,512**	**-0,316**
Affective Reaction	119	0,062	353	0,19	-0,128
Identity-Based Alignment	256	0,134	310	0,167	-0,033
Identity Conflict	0	0	287	0,155	-0,155
Legitimation	**604**	**0,318**	**414**	**0,223**	**0,095**
Legal Legitimation	127	0,067	0	0	0,067
Participatory Broadcasting	123	0,065	0	0	0,065
Political Economy Debate	266	0,14	396	0,213	-0,073
Social Benefit and Inclusiveness	88	0,046	18	0,01	0,036
Trust-Building Strategies	**924**	**0,485**	**109**	**0,059**	**0,426**
Mediatization	353	0,185	0	0	0,185
Scientific Rationale	144	0,076	9	0,005	0,071
Technical Operations and Safety	427	0,224	0	0	0,224
Trust Erosion	0	0	100	0,054	-0,054
Noise	**0**	**0**	**382**	**0,206**	**-0,206**

Main Themes and Subthemes	VT Frequency (f)	VT Percentage (%)	UC Frequency (f)	UC Percentage (%)	VT − UC Percentage-Point Difference
NA (Meaningless comment)	0	0	5	0,003	-0,003
Humorous/Sarcastic Approach	0	0	86	0,046	-0,046
Off-Context and Negative Remarks	0	0	256	0,138	-0,138
Troll Comments	0	0	35	0,019	-0,019
Grand Total	**1903**	**100**	**1855**	**100**	**0**

At the main theme level, Trust-Building Strategies is substantially more prominent in VT than UC (+42.6 pp), whereas Identity is more prominent in UC than VT (−31.6 pp). Noise is present in UC but absent in VT (−20.6 pp), while Legitimation shows higher relative emphasis in VT (+9.5 pp). Subtheme-level contrasts (Figure 1) are largest for categories present in VT but not UC (Technical Operations and Safety, +22.4 pp; Mediatization, +18.5 pp; Legal Legitimation, +6.7 pp; Participatory Broadcasting, +6.5 pp) and for categories present in UC but not VT (Identity Conflict, −15.5 pp; Off-Context and Negative Remarks, −13.8 pp; Trust Erosion, −5.4 pp). Further UC-skewed differences include Affective Reaction (−12.8 pp) and Political Economy Debate (−7.3 pp), whereas Scientific Rationale remains more prominent in VT (+7.1 pp). Identity-Based Alignment shows a comparatively smaller difference (−3.3 pp).

Across the three shared themes (Identity, Legitimation, Trust-Building Strategies), the VT and UC distributions differ significantly, χ^2 (2, N = 3,376) = 887.63, p < .001, Cramér's V = .51. A sensitivity analysis that additionally included UC-specific Noise as a fourth category yields the same conclusion, $\chi 2$(2, N = 3,376) = 887.63, p < .001, V = .51. Because multiple codes may be assigned to a single unit, these tests assess differences in coding distributions (code applications) rather than independent comment-level observations.

UC foregrounded off-context drift and contestation: Noise (20.6%, f = 382), Political-economy debate (21.3%, f = 396), Identity conflict (15.5%, f = 287), and Trust erosion (5.4%, f = 100) together comprised 62.8% of UC code applications.

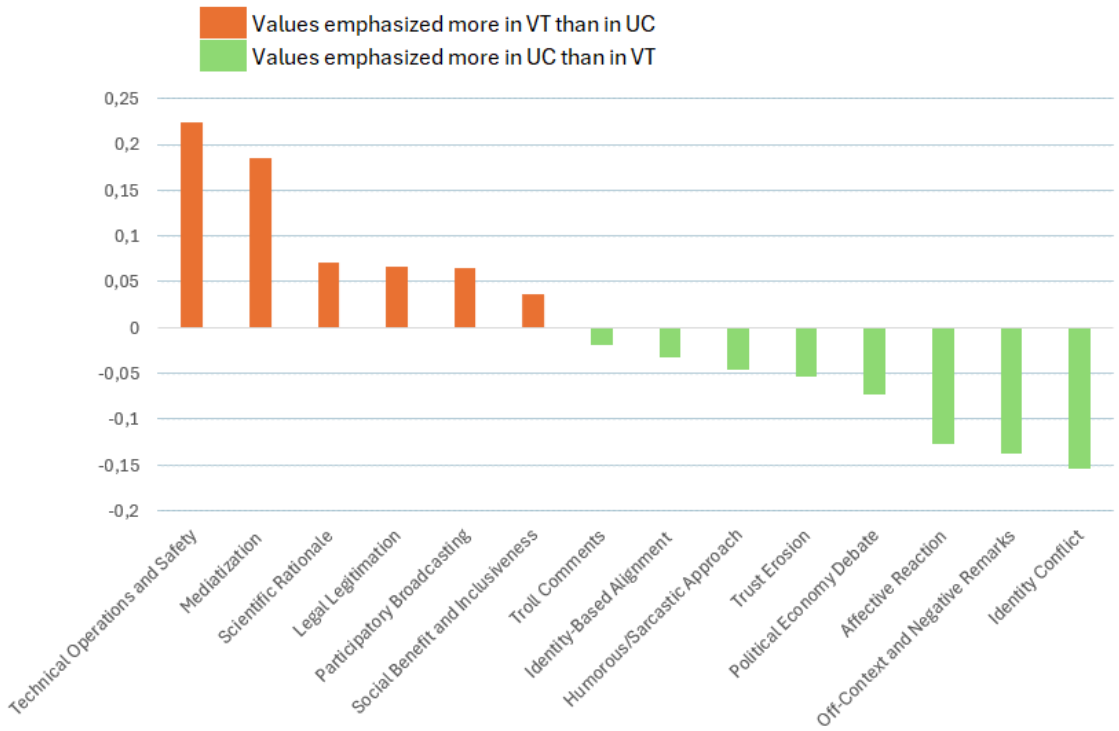

Figure 1: Differences in thematic emphasis between VT and UC

5. Discussion and Conclusion

This study examined how a science-focused live-stream discourse (VT) was re-articulated in the associated YouTube comment space (UC). We treated comments as a core layer of reception, not peripheral feedback. We show how mission-relevant scientific and technical messages were reframed under post-truth conditions, how event priorities shifted, and how the discussion became vulnerable to a drowning effect. We develop the drowning effect as a reception-level displacement mechanism and operationalize its observable components. We conceptualize the YouTube micro-community as an event-anchored micro-public that forms around a single broadcast page (Wu & Cui, 2025; Montes et al., 2025).

The VT to UC contrast is analytically consequential. VT kept scientific rationale at the centre through definitional work, clear information, and experiment-related content. VT also addressed technical operations and safety through references to inspection and verification. UC, by contrast, contained substantial noise, including humour and sarcasm, trolling, and off-context negativity. UC also included distrust and fiction or show framings that signal trust erosion.

5.1 Drowning Effect as Audience-led Recontextualisation in a Space-Mission Debate

The VT to UC divergence aligns with Lee et al.'s (2020) drowning effect. In this pattern, comment threads drift from the primary message and commenters disrupt gatekeeping by redirecting attention and simplifying complex content. In this case, VT's explanatory agenda did not structure UC meaning making. UC instead featured displacement-prone formats, including humour and sarcasm and provocation. Lee et al. (2020) identifies these formats as mechanisms that can drown out an initial message in YouTube contexts.

5.2 Trust-Building Attempts and the Persistence of Trust Erosion

A key implication is that transmission does not ensure uptake. Wehrmann and Dijkstra (2020) argue that outcomes depend on perceived credibility, message and receiver fit, and receiver receptivity. Internal and external noise can block intended meaning. In UC, Scientific Rationale codes co-occurred with Trust Erosion codes. This pattern suggests that some commenters engage with mission-relevant technicalities while distrust frames remain available and can be reinforced through interaction (Dobber & Hameleers, 2025; Nowak & Krämer, 2025).

This pattern aligns with concerns about contested credibility in digitally networked environments. Reif et al. (2024) link online heterogeneity and disinformation to post-truth politics and emphasize trust in science as a prerequisite for science's societal role. Van der Meer and Hameleers (2026) connect the crisis of truth and trust to delegitimation dynamics, including epistemic indifference. In this context, Trust Erosion and conspiracy are adjacent formats in UC, including trolling and provocation, reflect a predictable vulnerability of science communication in open comment architectures where credibility is continuously renegotiated.

This vulnerability fits post-truth conditions where shared truth standards do not stabilize interpretation and evaluation becomes entangled with affect and identity (McIntyre, 2018). Trust is relational. People judge expertise, integrity, and intent, often alongside legitimacy (Reif et al., 2024; van der Meer & Hameleers, 2026). In VT, communicators signalled trust through competence cues and procedural narration. In UC, trust appeared more often as erosion, with intent attributions and expertise contestation taking priority over evidential evaluation. Overall, drowning operates as a reception-level displacement dynamic. Even a strongly technical narrative can lose priority as comments reorganize attention around identity, legitimacy, and noise. Drowning does not require misinformation. Volume, polarized alignment, irony and sarcasm, provocation, and conflict spirals reduce the visibility of mission-relevant discussion (Kubin et al., 2024; Nowak & Krämer, 2025; Dobber & Hameleers, 2025; Egelhofer et al., 2024).

5.3 Legitimacy Contestation and the Politicization of Mission Meaning

UC did not treat the mission as science content alone. Commenters translated mission talk into legitimacy judgments about institutions, motives, and resource allocation. Off-context negativity framed the event as election propaganda and wasted money. This pattern shows how scientific events become sites of political-economy contestation. Verhoeff and Kupper's (2020) account of normative diversity helps explain this shift. Competing values and framings redirect attention from scientific rationale toward the legitimacy of actors, decisions, and symbolic meanings. Authority and responsibility judgments shape credibility. In UC, recurring propaganda and waste frames suggest that accountability and motive attribution became central to meaning

making, often competing with VT's explanatory register. This study does not claim causal pathways. Still, the recurring UC focus on propaganda and waste suggests that commenters negotiated mission meaning through accountability and motive attribution. These frames often competed with VT's explanatory register rather than extending it.

5.4 Implications for Science Communication Design and Evaluation

Science communication might aim at transmission (informing), motivating a dialogue, or supporting decision-making (Wehrmann & Dijkstra, 2020). Here, VT followed a transmission (structured explanation, definitions, and rationale) paradigm, while UC operated as a contested, audience-led arena prone to derailment.

The implication is that on YouTube, transmission alone does not sustain a science-relevant conversation. If the aim includes topic coherence, trust-building, or informed evaluation, treating the comment layer as part of the communicative system is necessary. Wehrmann and Dijkstra (2020) likewise note that effective communication depends on reciprocal openness and respectful exchange, conditions that open comment architectures rarely sustain without moderation and facilitation.

The VT to UC contrast also reflects socially embedded science and stakeholder pluralism. Koster and Kupper (2020) discuss socially robust science and expanded participation, including the salience of experiential and lay perspectives. Verhoeff and Kupper (2020) show how publics evaluate science issues through lifeworld concerns, political identities, and moral-economic judgments, not only epistemic criteria. Here, UC blended celebration, derision, suspicion, and politicized evaluation, which suggests multiple publics with divergent starting points. In this setting, drowning helps explain how reception shifts toward identity and legitimacy frames even when a technical narrative remains available (Lee et al., 2020).

5.5 Limitations and Directions for Future Research

Several limitations constrain inference. First, the study examines one broadcast and its comments, so generalization across missions, platforms, or contexts requires caution. Second, we identified derailment mechanisms in UC, but we did not establish causal links between VT moves and UC trajectories. Third, our evidence is thematic and comparative. Future work can add statistical comparisons of subtheme frequencies and network features, including reply structures and bridge commenters, to test whether drowning concentrates around interaction hubs. Despite these limits, the VT to UC contrast shows how platform conditions support audience-led gatekeeping disruption and recontextualize science communication into legitimacy and trust contestation. We also did not model platform mechanisms shaping comment salience, including ranking, engagement signals, moderation, and recommender systems (Hosseinmardi et al., 2024). Finally, the dataset reflects the platform at extraction. Users can edit or delete comments and engagement indicators change, which constrains reproducibility and limits claims beyond this episode.

Ethics Declaration

We analysed publicly available platform content. To minimize harm, we treated commenters as human participants and avoided unnecessary personal identifiers in reporting, including author URLs.

AI Declaration

An LLM supported language editing; all output was author-reviewed and approved. Data collection, coding, analysis, and interpretation were conducted solely by the researcher(s).

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