Tools to communicate science: looking for an effective video abstract in Ecology and Environmental Sciences

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Abstract

Video abstracts, filmed versions of scientific written abstracts, are an exciting trend in the world of online science videos, but, to date, the classification, conception and reception of these videos still need to be explored. This study aims to identify the most and least valued features, exploring future guidelines for producing an effective video abstract. For this purpose, 30 science video experts watched 21 video abstracts and filled out a questionnaire. Content analysis showed that video abstracts in Ecology and Environmental Sciences should be short, clear, objective, creative, dynamic and informative, mixing impactful live images with animation.

Keywords Environmental communication; Science and media; Visual communication

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Context

Online science videos: a world to explore

A recent study of YouTube preferences concluded that, despite Entertainment and Music being the most searched categories, videos from Science and Technology are among the top trending videos [Dubovi & Tabak, 2021]. An online science video is a short film that spreads scientific topics to a vast audience on the Internet [Welbourne & Grant, 2016], keeping rigour and accuracy [García-Avilés & de Lara, 2018].

Online science videos feature a wide variety of producers and formats [Erviti, 2018; Erviti & Stengler, 2016; García-Avilés & de Lara, 2018], making them versatile tools that are, in many cases, difficult to classify. Muñoz Morcillo and co-authors [2016] identified a wide variety of genres and subgenres, a moderate production complexity and a high editing and storytelling density that point to sharp professionalism in online science videos [Muñoz Morcillo et al., 2016]. García-Avilés and de Lara [2018] classified online science videos into 18 different formats, grouped into television formats — produced for this purpose and then

uploaded online — and web formats — explicitly produced for the Internet. This categorization demonstrates the flexibility and autonomy of videos: one can have an interview, a debate, a documentary, a monologue, an experiment, an infographic, or a mix of genres [García-Avilés & de Lara, 2018]. Interview videos are less popular than vlogs, while animations are the most popular [Velho, Mendes & Azevedo, 2020]. Huang and Grant [2020] concluded that a popular science video on YouTube is usually an emotionally engaging story that answers a science-related question, having some twists and revelations along the way.

The Videonline Project [2018] described media companies as the producers of more than half of the science videos they analyzed (826 videos about climate change, vaccines and nanotechnology), in opposition to videos produced by scientific institutions and non-professional users [Erviti, 2018]. More recently, studies pointed out that presenters who do not belong to any scientific institution, despite having an academic background, were responsible for the most successful science communication videos on YouTube [Boy, Bucher & Christ, 2020; Donhauser & Beck, 2021]. Debove and co-authors [2021] analyzed 622 French science channels and concluded that science communicators are primarily young males with higher education who talk about topics they know about [Debove et al., 2021]. Also, most of them worked alone and took the audiovisual production of science as a hobby, not having any specific training in the field [Debove et al., 2021]. Finally, Velho and Barata [2020], who analyzed the "Science Vlogs Brasil" project, established by 39 science channels on YouTube, described the channel owners as young male teachers with higher education in Exact Sciences, Earth Sciences and Life Sciences.

As authors of their work, researchers are key figures in transposing written science into audiovisual media [Smith, 2020]. They remain connected to institutional channels [Erviti, 2018] but are increasingly challenged to effectively transfer their knowledge and communicate to various audiences [Maynard, 2021]. Therefore, researchers, seen by the public as more trusted and experienced presenters [Ruzi, Lee & Smith, 2021], are challenged to pick up the camera, replacing media professionals. Researchers who became filmmakers say that producing a movie is similar to field research [Olson, 2018]. As in science, they also have to "collect observations, shape them into a story and distribute the product" [Kwok, 2018]. Some authors listed the questions that a researcher needs to ask before engaging in such a task (e.g., what equipment is required) [Brennan, 2021] and the necessary steps to produce a science video (i.e., identify the topic, write the script and storyboard, record the voiceover, film the scenes, edit the movie, look at the last details and upload it on YouTube) [Maynard, 2021]. At the same time, several workshops and guidebooks are available to provide students and researchers with the necessary tools to produce their own science videos [Angelone, 2019; Bell, 2020; Chan, 2019; Kwok, 2018; Olson, 2018; Plank, Molnár & Marín-Arraiza, 2017; Vachon, 2018]

Video abstract: a swiss army science video

In this myriad of contents and players, video abstracts are a differentiating solution that can fulfil several roles. As its name suggests, a video abstract is an audiovisual summary of the written abstract, a film containing all the scientific paper elements, from the introduction to further recommendations, including the methods, results, and discussion [Berkowitz, 2013; Spicer, 2014].

Despite the growing number of specialized companies creating this kind of product, most focusing on animation (e.g., Research Square, SciPod, Promoshin), video abstracts still lack a distribution strategy in the digital environment. These videos continue to be used mainly for peer-to-peer communication, indexed in scientific journals or uploaded to video channels, and, in many cases, are not promoted to other audiences [Ferreira, Lopes, Granado, Freitas & Loureiro, 2021; Ruzi et al., 2021]. On the one hand, they are essential for students and researchers to demonstrate complex processes that are difficult to reproduce by writing [Jamali, Nabavi & Asadi, 2018]; for instance, JoVE (Journal of Visualized Experiments) protocol videos cited in other papers and mentioned on Twitter with practical and methodological purposes [Jamali et al., 2018; Xu, Yu, Hemminger & Dong, 2018]. Also, a video abstract could positively impact academic dissemination and, eventually, article citations [Bonnevie et al., 2023; Shaikh, Alhoori & Sun, 2023; Zong, Xie, Tuo, Huang & Yang, 2019]. On the other hand, video abstracts have the potential to expand narratives to new audiences, platforms, and networks [Kippes, 2021].

Bredbenner and Simon [2019] evaluated, through a survey, the comprehension and enjoyment of the audience when exposed to different kinds of summaries of the same scientific paper. The authors concluded that video abstracts are more successful than the original and graphical abstracts in achieving audience understanding and satisfaction with the scientific topics. Furthermore, video abstracts guarantee accuracy and credibility compared to other online science videos. This is particularly important as, in recent years, the democratization of online videos has brought excessive content and misinformation [Allgaier, 2019; Rosenthal, 2020]. In Brazil, for example, in recent years, pseudoscience channels have grown proportionately more in views and subscriptions than scientific dissemination channels [Fontes, 2021]. The effective use of online science videos requires a delicate balance between achieving an informative yet entertaining narrative without compromising scientific rigour [Pavelle & Wilkinson, 2020]. As video abstracts are a production arising from institutes and universities, they can act as a guarantee stamp, similar to what happens, for example, in the ScienceVlogs Brasil project, which created a badge to ensure the scientific quality of its videos [Velho & Barata, 2020]. This guarantee opens opportunities for high schools and other educational institutions to explore these science videos as educational tools [Almeida & Almeida, 2021; Beautemps & Bresges, 2021; Moreira & Nejmeddine, 2015; Rosenthal, 2020]. High school teachers have recognized that a video abstract could be used in the classroom as an essential and valuable tool integrated into a broader pedagogical strategy [Ferreira, Loureiro, Granado & Lopes, 2023].

Video abstract in Ecology and Environmental Sciences

Across the globe, human activity has affected most ecosystems, with biodiversity indicators showing a fast decline [Díaz et al., 2019]. Direct drivers (including fishing, harvesting, and land use change) and indirect drivers (including overpopulation growth and human-induced climate change) are creating irreversible losses, putting global agendas at risk (e.g. the economic, social and environmental efforts of the Sustainable Development Goals) [IPCC, 2023; Díaz et al., 2019]. Communicating new and innovative knowledge emerging from ecology and environmental sciences is fundamental for sustaining a healthy planet.

Research on the role of online videos in communication about science and the environment is growing [Allgaier & Landrum, 2022]. However, academic scientific videos do not share the same attention as popular science videos on YouTube. Videos produced by researchers, universities, or specialized companies remain underexplored by researchers, with no guides to best communication practices. Moreover, to our best knowledge, no studies have explored video abstracts' classification, conception and reception.

This study takes a multidisciplinary approach and explores for the first time the reception of 21 video abstracts of Ecology and Environmental Sciences by an expert panel, identified through their recognised foundational knowledge of science videos. Specialists from four main groups — (1) Research; (2) Science Management and Communication; (3) Marketing, Design and Multimedia; and (4) Education — embody important visions and unique pathways to different audiences. Our main goals were:

1. Comprehend the multiple potentialities of video abstracts in scientific dissemination;
2. Identify the most and least valued features in video abstracts;
3. Explore the characteristics of the video abstracts taking into account reception metrics;
4. Propose some future guidelines for producing an effective video abstract.

This approach enabled us to explore the potential of the video abstract as a communication tool among peers and a dissemination/education resource for the student community.

Methods

The research design comprised three main steps: selecting a sample of 21 video abstracts from a broader corpus of 171 videos, developing and applying a questionnaire to 30 evaluators and conducting a content analysis of their responses.

In previous work, using impact factor as a selection measure, 171 video abstracts from 17 video channels, 29 academic journals and 7 publishers were identified and categorized [Ferreira et al., 2021]. Of the 40 journals of Ecology with the highest impact factor, according to the Journal Citation Reports 2018 [Clarivate Analytics, 2018], only 4 used video abstracts. So we broadened the study to include the field of Environmental Sciences alongside Ecology, which allowed us to add 25 more journals to the sample. According to our definition of a video abstract, the sample we collected was drawn from scientific journals' websites and video channels. We also extended the search to researchers' webpages, social networks and specific science video production companies.

From that sample of 171 videos, 20 video abstracts representing different formats, types of production, duration, and sound quality were selected using purposive sampling [Palys, 2008] (Table 1). Beyond the journals, publishers and formats represented, we tried to embody all variations inherent to each video (the same journal can have many videos with the same structure, while the opposite can also

happen, i.e., a journal channel can have few videos, but where each video presents differences within the same format as animations with different styles). Thus, this selection process ensured the diversity of the videos as a whole.

Table 1. Viewed videos by the evaluators.

Video Nº	*Duration*	*Journal*	*Editors*	*Format*	*Title/Link*
11	04:00	Functional Ecology	Wiley	Documentary	Does Ecotourism in the Bahamas affect Tiger Shark Movement and Behavior? https://youtu.be/9iFl7BxbnXQ
16	02:20	Functional Ecology	Wiley	Monologue	The effects of weather on dispersal behaviour of free-ranging lizards in tropical Australia https://youtu.be/TDC_wG_sR1Q
17	05:38	Functional Ecology	Wiley	Documentary	Hovering on a high fructose diet: hummingbirds can fuel expensive flight with glucose or fructose https://youtu.be/TGczsWrCre4
23	01:10	Functional Ecology	Wiley	Documentary	To know a scorpion by its tail: the tail strike of scorpions differs between species https://youtu.be/7dHsNmqs8Bs
33	08:20	Journal of Ecology	Wiley	Simple Presentation	Julie Messier — Interspecific integration of trait dimensions at local scales https://youtu.be/xAHLsLUd_XM
53	03:22	Ecography	Wiley	Documentary	The mismatch in distributions of vertebrates and the plants that they disperse https://youtu.be/NGkLXD5Uvms
68	04:55	Current Biology	Cell Press	Documentary	Establishing beneficial plant-fungal symbiosis https://youtu.be/DrsNuwOnoEM
75	05:06	Current Biology	Cell Press	Documentary	Coral Reef Fisheries and Habitat Degradation https://youtu.be/U8TQoCykaKU
64	05:32	Current Biology	Cell Press	Documentary	Chivalrous insects https://youtu.be/Bzxs6pqTrII
89	01:54	Current Biology	Cell Press	Documentary	Mapping Earth's Diminishing Marine Wilderness / *Curr. Biol.*, Jul. 26, 2018 (Vol. 28, Issue 15) https://youtu.be/yUYPSAhpqBA
93	04:32	Current Biology	Cell Press	Documentary	Vocal Turn-Taking in Meerkat Group Calling Sessions / *Curr. Biol.*, Nov. 8, 2018 (Vol. 28, Issue 22) https://youtu.be/nF3JUzdmG2Y
84	01:57	Current Biology	Cell Press	Animation	Fish Biodiversity Loss in a High-CO2 World / *Curr. Biol.*, Jul. 6, 2017 (Vol. 27, Issue 14) https://youtu.be/fUMPQ4ODQJ8
171	03:51	Metabolites	MDPI	Animation	Glycerol as alternative ingredient for fish feed — potential for aquaculture https://youtu.be/rhk1taqRlOo
106	03:55	Nature	Nature	Animation	Handing on a sustainable future https://youtu.be/xrXyRJV96mk

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Table 1. *Continued from the previous page.*

Video Nº	*Duration*	*Journal*	*Editors*	*Format*	*Title/Link*
99	02:28	Nature Ecology & Evolution	Nature	Documentary	How to help pollinators in cities https://youtu.be/JsypVU8VkS4
110	02:43	Nature	Nature	Animation	How many trees are there in the world? https://youtu.be/jqdOkXQngw8
116	02:28	Scientific Reports	Nature	Animation	Common pesticides pose threat to seed-eating songbirds https://youtu.be/i5rkN154PO8
121	02:00	Plants, People, Planet	New Phytologist Trust	Dynamic Presentation	Hydnora: the strangest plant in the world? Flora Obscura with Chris Thorogood https://youtu.be/4l3pftfCy_w
136	04:25	Science Advances	AAAS	Documentary	Araújo et al. 2019. Standards for distribution models in biodiversity assessments. Science Advances https://youtu.be/iS31WaKMW_Y
143	02:39	Science	AAAS	Documentary	Megarafting animals rode from Japan to US and Canada after the 2011 tsunami https://youtu.be/L3QGiPpXaC0
153	02:53	Ecohydrology	Wiley	Animation	A 3-in-1 tool for climate change and resiliency assessments https://youtu.be/ddcuq5tgHHQ

After categorising the videos and reviewing the literature, we also created an original video abstract. The video, based on the scientific paper "Metabolic effects of dietary glycerol supplementation in muscle and liver of European seabass and rainbow trout by 1H NMR metabolomics" [Palma et al., 2019], was written by researchers of the Centre for Functional Ecology (CFE) at the University of Coimbra. We added the video to the sample (video nº 171). This add-on allowed us to explore the evaluation and classification procedure, gathering individual and valuable data comparable to a group of similar videos.

We adopted the expert panel method, where a forum of specialists in a given field share their experiences and opinions [Galliers & Huang, 2012]. To create the expert panel, we searched for experts with professional experience linked to the processes inherent to video abstract production. So, we created four primary areas of interest: (i) Research; (ii) Science Management and Communication; (iii) Marketing, Design and Communication; and (iv) Education. These four main fields covered the complete life cycle of a video abstract — from paper to YouTube — and gave us a global perspective of the video abstract as a science communication tool. The aim of bringing together this expert panel was to provide us with powerful insights into knowledge production and academia, science communication among peers and new audiences, audiovisual language and good practices of design, as well as ways to use the video as an educational tool.

Through our professional network, we obtained a list of fifty names and invited them all to participate in the study via email. Thirty experts showed interest and were available to participate in the study. The group comprised individuals between 29 and 45 years old and educated (with graduation, MSc, and Ph.D.

degrees) in Biology, Philosophy, Sociology, Environment, Education, Data Science, Design, Geology, Journalism, Chemistry, Multimedia and Mathematics. We brought together a unique and specialized panel representing a wide range of professions, including researchers, science communicators, science managers, educators, teachers, videographers, designers, data scientists, and marketing and entertainment show technicians.

We invited the panel of experts to complete a questionnaire, which consisted firstly of two closed questions (using a Likert Scale) and one open-ended question about viewing habits and video abstract importance (appendix A). The first closed question aimed to understand how often the group watched science videos. The second closed question asked if a video abstract benefited research dissemination. If the answer was yes, the participants had to justify their choice.

The evaluators then watched the 21 science videos. The videos were ordered randomly. The expert panel were not informed that one of the videos was produced by the researchers to avoid biasing the results. Informed about our definition of the video abstract and the factors we were evaluating, we asked the expert panel members to rate each video numerically from 0 to 10 (0 as the worst and 10 as the best score). The total viewing time was 72 minutes. Next, we asked the evaluators to view the video abstracts in sequence, from video 1 to video 21, with some breaks if necessary. Using Microsoft Excel, we analyzed the video rating responses and looked for patterns in the quantitative data by comparing the video ratings with the video duration and the number of views per day.

Finally, we asked the evaluators two open-ended questions: what did you like most, and what did you like least about each video abstract? Then, we performed a content analysis using the MAXQDA software to analyze the answers. The first goal of the content analysis was to organize the responses into a system of categories that would translate the fundamental ideas present in the data [Amado, 2000]. We conducted an inductive analysis of the responses and produced an analytical grid containing all categories and subcategories. We analyzed 1260 response units, later divided into 1740 units of analysis. The process produced 7 categories and 19 subcategories (appendix B).

Results

Video abstract as a science communication tool

Almost half (43%) of the evaluators stated that they viewed science videos occasionally, 23% rarely, and 20% watched them regularly.

Most of the respondents (83%) thought that the existence of a video abstract could be helpful for research dissemination. The twenty-five positive answers justifying this choice were analyzed. Forty-four registration units were identified and divided into four main categories. Table 2 presents the results of this analysis.

Two categories dominated the answers. The first was the capability to reach a larger and more diverse audience. So, issues such as citizenship, science democratization, active participation, and awareness were mentioned. The second category focused on how science videos convey the message. According to members of the expert panel, video abstracts simplify complex scientific

Table 2. Content analysis results in the answers on why consider the video abstract a vital tool to disseminate scientific information.

Category	*Record units*	*Examples*
It increases message range and audience diversity.	19	"It is a vehicle for transferring information from a more technical scientific publication to a wider audience (...). It democratizes information."
		"It is a means of disseminating knowledge that can reach a wider audience, promote public access to science, and foster more inclusive and participatory citizenship practices."
		"To enhance the attention in online social networks."
		"It makes outreach immensely easier."
		"Possibility of dissemination by different types of audience, being more physically accessible to most of the population."
It conveys the message in a clear, innovative, effective and appealing way.	16	"It is one of the most effective ways to show the value of science."
		"Facilitates the understanding of the message (...)."
		"A video abstract is a novel way to present and spread information about your research."
		"This format allows, in a fast and appealing way, to pass an objective message with the main results of the work (...)."
		"Video is the most consumed media format on the internet today, being the best way to convey any type of message, capturing the viewer's attention to the topic in question in the best way."
It allows for greater content plasticity.	5	"This more malleable quality allows it to acquire shapes beyond a traditional abstract, work as a scientific document or call for attention, closer to the advertising language, or as a business card for a research or institution."
		"Possibility to animate general results and conclusions."
		"It allows you to use schemes, images, and animations that otherwise (in the scientific article) would not be possible."
It has potential as an educational tool.	4	"It is easier to capture students' attention with these videos. It is much better than the usual PowerPoint presentations because they can show locations and interviews on the subject."
		"(...) these types of videos could prove to be powerful tools that allow the output of research articles from the niches of the University and Research Centre, starting to function as another important teaching tool, in different contexts and for different types of publics."

procedures, valuing science and bringing researchers closer to the public. It is a fast, effective, innovative, dynamic, clear and appealing way of getting the scientific message to the "outside world". The video abstract was perceived to be a facilitator. Expert panel members noted that various production options make video abstracts a chameleon-like product, adapted to different realities and needs. Finally, the video abstract was mentioned as an attractive tool to be used in the classroom and a possible bridge between high schools and universities.

Evaluation of the video abstracts and trends with other parameters

Figure 1 presents the average ratings of each video abstract. The average rating score given to the 21 video abstracts was 6.63 ± 1.6. The three highest-rated videos (in dark blue) had ratings above eight points, 8.20, 8.27 and 8.83, respectively. The video we produced (in green) had the sixth-highest rating score, with 8.07 points. The lowest-rated video had 2.90 points, and three more videos had a rating score below 5 (in orange).

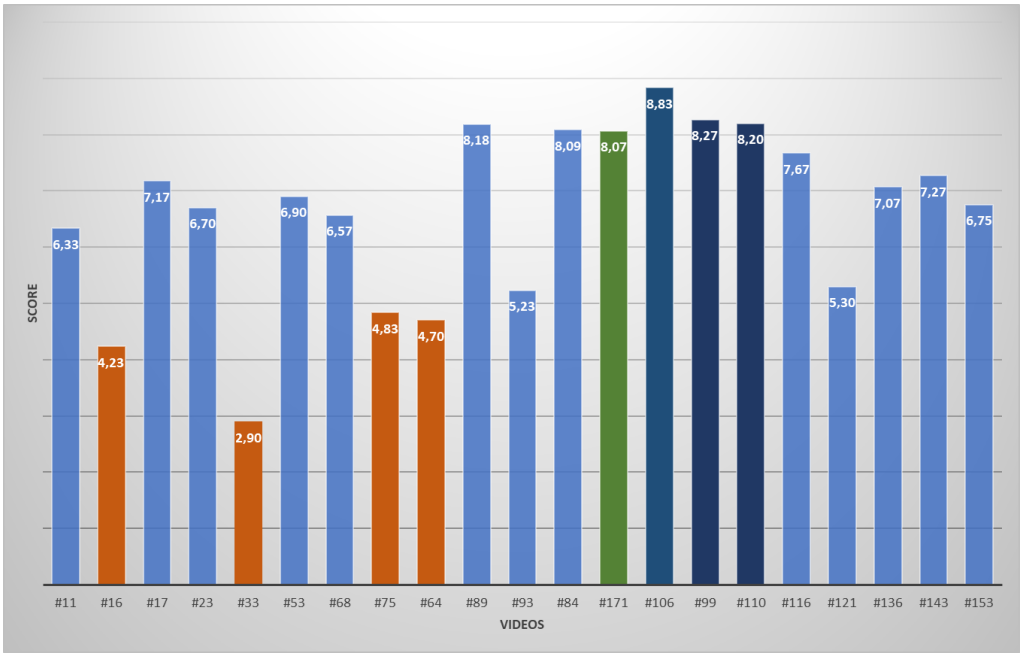

Figure 1. Average video rating score by viewing order (from left to right).

The average duration (in seconds) of the 21 videos was 217.5 ± 101, and the three highest-rated videos ran below 240 seconds (Figure 2 and Figure 3). The video we created and included in the analysis was close to the average length, representing a middle point in terms of length (Figure 3). The video with the lowest rating score was the most extended video of the set (500 seconds) (Figure 2 and Figure 3). Also, two of the videos with low rating scores (4.83 and 4.70) are two of the longest in the set (306 and 332 seconds, respectively) (Figure 2 and Figure 3).

The attractiveness of shorter videos is reflected in views per day. The average number of views per day for the video set was 16.2 ± 41.7 (Figure 4), and the three highest-rated videos (106, 99 and 110) were among the ones with the most daily views (Figure 4 and Figure 5). Furthermore, except for video 64, all the other videos with the lowest scores had an average number of views per day below 1 (Figure 4 and Figure 5). The shortest video (70 seconds) was the most watched daily (171 views per day). Conversely, the longest video (500 seconds) was the third least-watched video in the set (0.3 views per day).

The three videos ranked highest by expert panel members were professional productions from the journal Nature, uploaded on the Nature Videos YouTube channel. All three videos have a third-person narration and use stop-motion animation techniques or real footage to tell their stories. Conversely, the videos

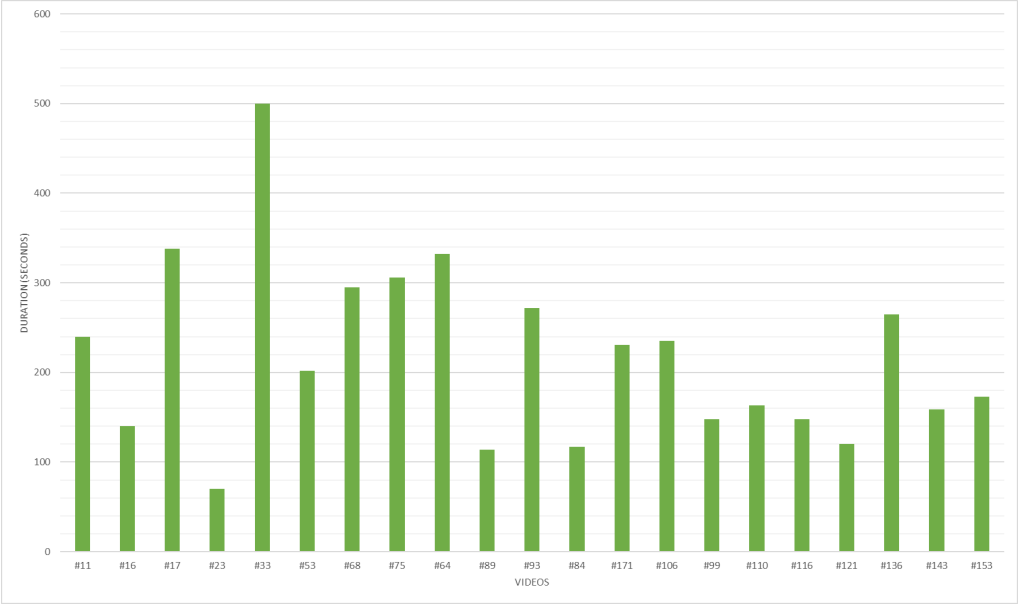

Figure 2. Duration of the watched videos (in seconds).

Figure 3. Average video rating score by duration ascending order, from left to right.

with the worst ratings were all amateur productions based on slide presentations or monologue formats. In general, the evaluators classified the quality of the image and sound as bad in videos that they rated poorly.

Video abstract in Ecology and Environmental Sciences: the most and least appreciated factors

After collecting expert panel member responses from the prompt about the factors they most appreciated about each video abstract, we identified nine hundred and twenty registration units from the content analysis.

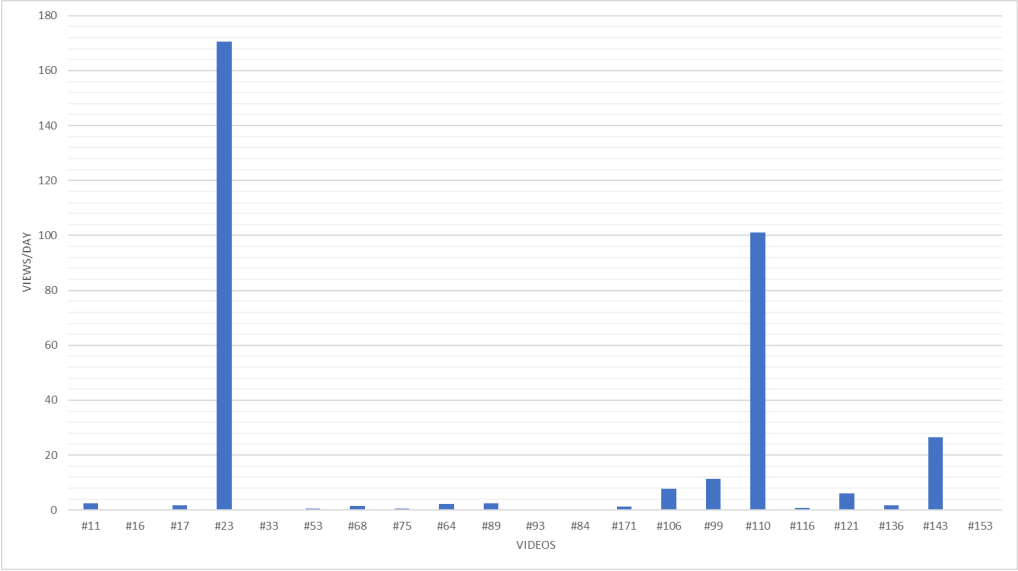

Figure 4. Number of views per day of the videos (collected on March 8, 2022).

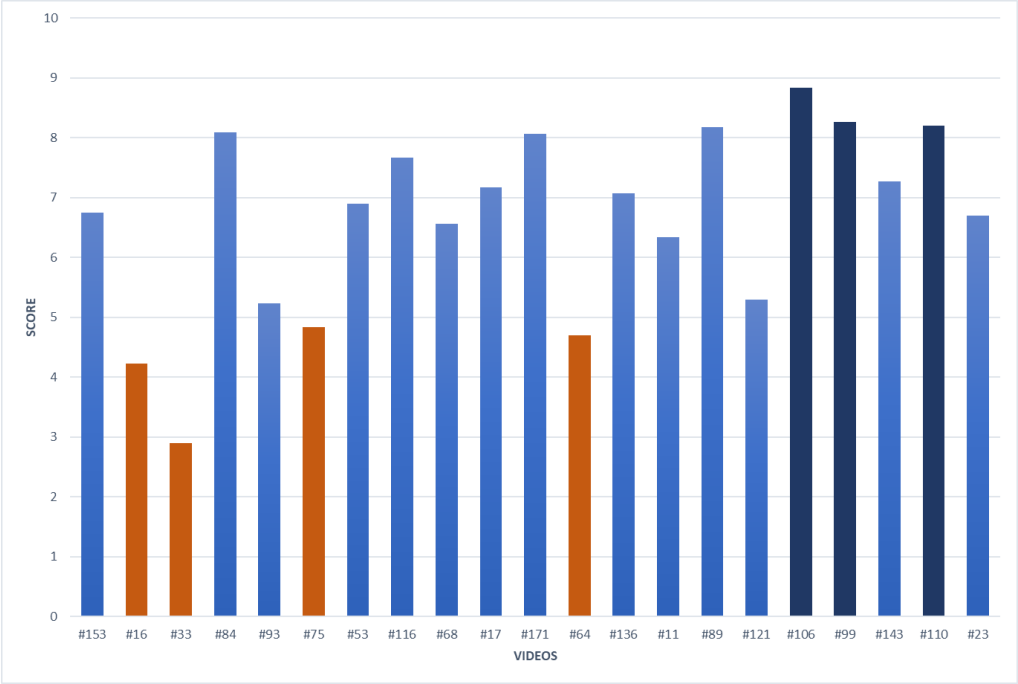

Figure 5. Average video rating score by views per day ascending order, from left to right.

Visual resources stand out in the proposed categories (Figure 6). Expert panel members emphasised the images, the footage and their features. The category least mentioned by the expert panel was audio. The production category came in second place, comprising all the processes of video conception and its features. The script writing and all the steps related to the editing process — rhythms, transitions, different environments — played a leading role in the positive viewing experience, according to the expert panel members. The expert panel used commonplace terms to highlight general characteristics of video quality. The most commonly recurring words used to describe a compelling science video were clear, concise, original, dynamic, and compact (Figure 7). The third category most mentioned by expert

Figure 6. Most appreciated factors by the evaluators.

panel members was the topic of the video. The characteristics of the message, the idea and the information conveyed in the video were the most commonly described qualities contained in this category. Also, the specific moments of the video (e.g. conclusion, introduction, results) were highlighted positively. The factors concerning narration and presentation were in the penultimate place; the expert panel focuses on the qualities of the speech, the narration and the narrator.

The content analysis to the question "What did you like least about the video?" resulted in eight hundred twenty-six registration units.

The categories identified in responses to this question are more equally distributed when compared to the categories described in the previous section (Figure 8). The most mentioned category covered production procedures. The format and duration were most referred to as being least attractive. The expert panel indicated that the least desirable qualities of the video abstracts were a lack of quality, clarity and objectivity, the monotony and being too specific. The least liked qualities of the videos that expert panel members mentioned next were specific aspects of the videos, with the images and the graphic images being the most mentioned. The presentation and the audio were in third and fourth places, respectively. The sound and its features were more commonly noted in response to the prompt about what panel members liked the least, compared to what they liked the most, perhaps indicating that good sound quality goes unnoticed, but the bad sound quality is noticed as particularly problematic. Lastly, in the set of responses to this question was the topic, which had fewer mentions to this question compared to the question asking about the positive qualities of the video.

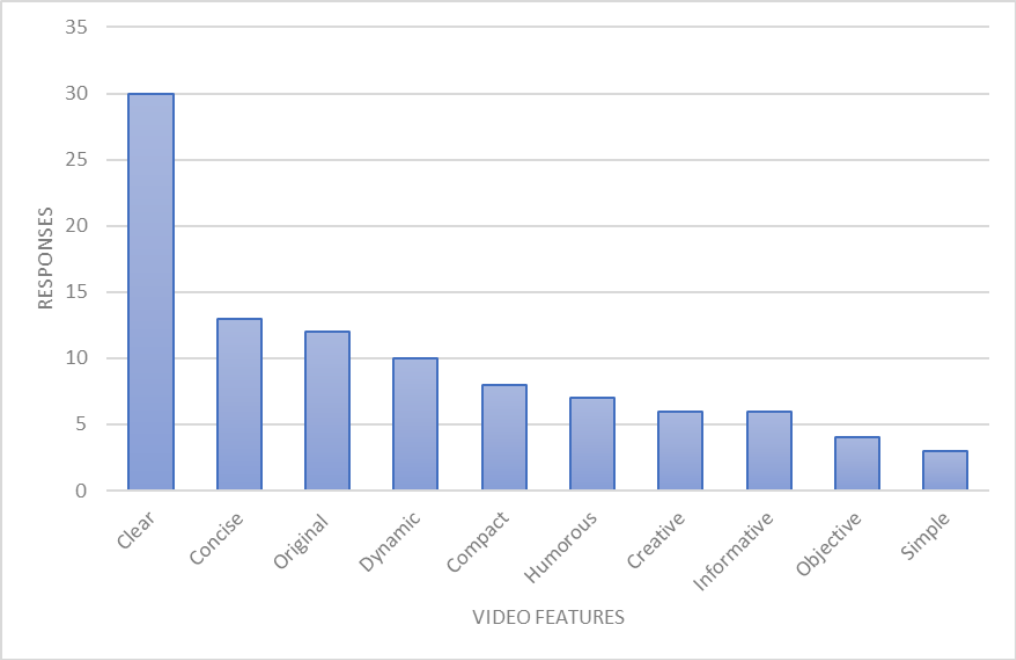

Figure 7. Most mentioned words in the "Production — Video Features" category.

Figure 8. Least liked qualities noted by the evaluators.

Discussion

In this study, we set out to identify the most and least valued features of video abstracts in Ecology and Environment Sciences and provide future guidelines for producing effective video abstracts. The discussion is organized into three main sections: (i) the advantages and potentialities of the video abstract; (ii) the current popularity metrics and future ways to improve the video abstract, and

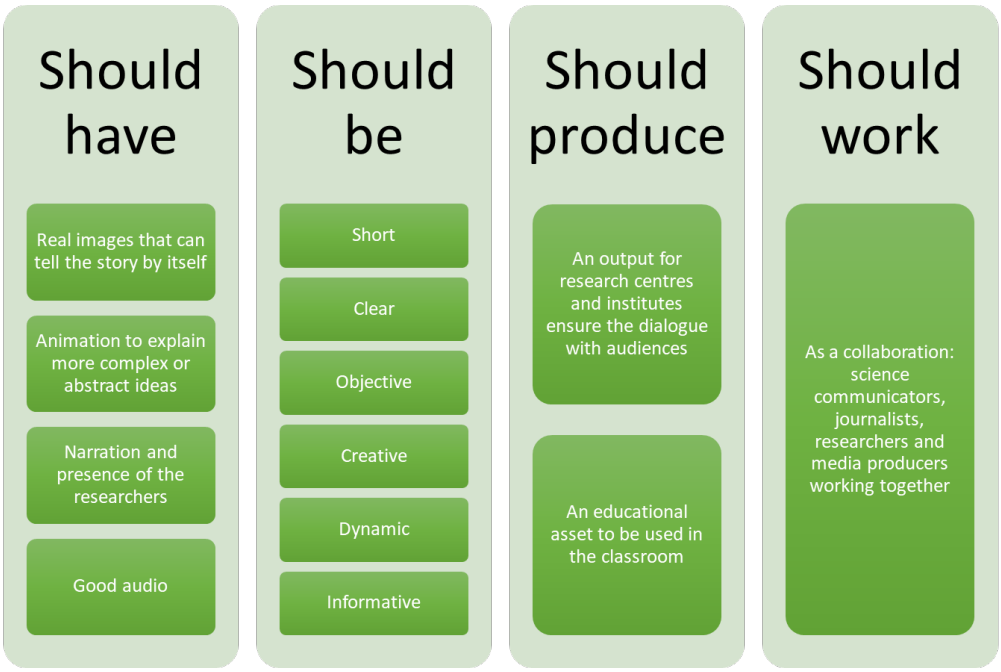

Figure 9. The main features proposed to a video abstract in Ecology and Environmental Sciences.

(iii) a deeper look at the key categories that emerge from our analysis. To sum up, Figure 9 summarises the main findings and offers a good practice scheme for video abstracts in Ecology and Environmental Sciences.

A word to say in science communication and science education

The expert panel (Table 2) highlighted several resources (e.g. photos, diagrams, graphics, maps or animations) that video creators could use to raise awareness about a scientific topic and complement traditional media. The flexibility feature in this new digital environment is common to all science videos [Erviti & Stengler, 2016; García-Avilés & de Lara, 2018]. However, we were interested in exploring the new possibilities that the specific context of video abstract production brings, particularly within the audiences.

As shown in Table 2, the benefits of the video abstracts to reaching a larger and more diverse audience were recognized by panel members, thus promoting dialogue and participation [León & Bourk, 2018]. As mentioned in some of the responses, video abstracts offer the possibility to increase the democratization of science and citizen science participation. This can be a helpful addition as recent studies have shown that, on the one hand, videos without institutional gatekeeping and that explore new formats lack the contextual dimension of science [Vasquez-Muriel & Escobar-Ortiz, 2022]. On the other hand, universities seem to be more prone to marketing than to creating a dialogue with the public [Weingart, 2022], moving to a (de) centralized communication of science [Entradas, 2022]. In this model, the institutes and research centres are where science communication and its dialoguing roles [Bucchi & Trench, 2021] have a space to grow [Entradas, 2022]. Video abstracts in Ecology and Environmental Sciences, and their research, settle down on a problem to be solved, presenting findings and solutions, with the

final goal of sustaining a healthy life on planet Earth. As tools sprouted in the institutes and research centres, transversal to dissemination, dialogue and participation, they could have a central role in the social conversation around science [Bucchi & Trench, 2021].

Also, the evaluators recognized (Table 2) that video abstracts ensure scientific rigour, often absent from online science videos, as also highlighted by Velho and Barata [2020]. This scientific insurance presents a possible added value for educators and teachers [Almeida & Almeida, 2021; Moreira & Nejmeddine, 2015], who could use the videos in their classrooms as an alternative to more traditional resources [Ferreira, Loureiro et al., 2023]. At the same time, demystifying certain misconceptions about science could attract and approach new students to a scientific career [Fiolhais, 2016] and align with both the promotional goals of the universities and the dialoguing roles of the research centres discussed above. Further research on the sci-comm applications of video abstracts at research institutes and their impact on audiences is recommended.

A short video resulting from long and collaborative work

Despite no clear pattern and proportionality between the duration and the established rank (Figure 3), there are two interesting correlations involving the running time of the videos: the shortest video (nº 23) had the most views per day. In contrast, the longest video (nº 33) had the lowest rating overall (Figure 2 and Figure 3). Also, the six videos with the best scores (nº 89, 84, 171, 106, 99 and 110) are all below four minutes long (Figure 2), which is in line with the recommendation of our previous paper (i.e., the ideal length for this type of content is between two and three minutes) [Ferreira et al., 2021]. Short videos strengthen long-term information retention, although it depends on the viewer's gender [Slemmons et al., 2018]. Also, a study on user engagement showed that video length is inversely proportional to view counts, and longer science videos receive fewer views on average [Yang, Brossard, Scheufele & Xenos, 2022]. Therefore, we recommend short video abstracts without compromising the scientific content from the data explored here.

Another factor not directly proportional to the rank established by the expert panel was the number of views per day (Figure 5). Although the three best-ranked videos are among the top five most watched and two of the least-ranked videos are among the top three least-watched videos, there was no evident correlation among the total sample (Figure 4). This variation confirms that views are an imperfect measure: Yang et al. [2022] showed that videos with higher view counts have lower engagement regarding average view duration and average percentage viewed [Yang et al., 2022]. Understanding and increasing user engagement with the videos is fundamental to more effective science communication [Yang et al., 2022]. Future studies on YouTube data, e.g. average retention time or views by age and gender, are recommended to understand the actual dynamics of visualization and engagement. It will be fruitful to go beyond visualization metrics to assess and identify compelling science videos, e.g., new algorithms are needed to highlight rigour and quality in science videos presented on platforms like YouTube [Hoang, 2020]. For example, the algorithm could privilege scientifically certified videos (e.g., from scientific journals, universities, and research centres) and highlight

relevant topics in the scientific/political agenda (e.g. biodiversity loss). Furthermore, informative, rigorous, original and dynamic features could be evaluated in YouTube surveys for each video and highlighted in recommendations. Also, social networks such as Twitter can be understood as new areas of interest [Xu et al., 2018] that can bring fresh inputs to the video's abstract reality.

Finally, production emerged as another important factor as the top-rated videos (nº 106, 99 and 110) are all professional productions; instead, the lowest-rated videos (nº 16, 33, 75 and 64) are all amateur productions (Figure 1). The videos rated as being most effective have good production values, with editing dynamics, as an alternative to a simple lecture, which is in alignment with Thelwall, Kousha, Weller and Puschmann [2012] argumentation. These results support the recommendation that although a researcher can produce a video in a low-cost model [Brennan, 2021; Maynard, 2021] and that training sessions are important for researchers to improve their communication and creative skills [Angelone, 2019; Angelone, Soriguer & Melendo, 2020; Plank et al., 2017], teamwork, like the one found in professional productions, is fundamental to achieving an effective result that qualitatively translates scientific research [Ferreira, Lopes, Granado, Siopa et al., 2023]. Writing the script, planning the filming sessions, meeting with researchers, collecting images in the field, searching online resources, and editing different film versions, are all processes that require group commitment [Velho & Barata, 2020]. It is not enough to upload the video online to be effective [Finkler & Leon, 2019]. A strategy for implementing and disseminating these videos in the online environment is needed [Erviti & Stengler, 2016]. As in general science communication, a synergy of efforts among researchers, communication and media offices, science communicators, and other stakeholders is ideal [Kalmár & Stenfert, 2020]. A future recommendation comprises the implementation of networks, not only operational, where a channel with video abstracts recommend and disseminates other channels with rigorous and captivating content, but also emotional, where authors promote the co-construction of knowledge and creation of communities with their audiences [Erviti & Stengler, 2016; Muñoz Morcillo et al., 2016; Rosenthal, 2020].

Key categories for an effective video abstract

Images were the most liked category in the visual resources section (Figure 6). It is interesting to highlight that the negative comments focused on the specific features of the images. That is, images by themselves, comprising all the videos, footage and photos, positively impacted the viewers. This strength confirms that video abstracts, like most science videos, must first be visual and present differentiating visual value [Olson, 2018]. Ecology and Environmental Sciences are privileged fields where it is relatively easy to catch impressive footage. The predisposition of the expert panel towards visuals confirms this (Figure 6). As well as in the Visual Resources category, the theme and content by themselves were only pointed out in the positive reviews, reinforcing the intrinsic value of these topics to our expert panel. In the future, it will be interesting to explore two other sides of the content features: first, to understand, in the Ecology and Environmental Sciences fields, what specific areas give rise to more engagement with the audiences and second, to promote comparative studies in or with other sciences (e.g. can a video abstract in a not so visual and appealing field compete with a video abstract about the natural world?).

Beyond the intrinsic power of images and topics, the experts highlighted animations as one of the most appreciated. Also, from our experience, the specialized companies producing video abstracts tend to rely mostly on animated solutions (e.g. Research Square, Science Office, Promoshin). Boy and co-authors [2020] showed, using views per day, that YouTube genres like presentation films and animations are much more popular than traditional and institutional formats like explanatory narrative films and expert films [Boy et al., 2020]. However, explanatory narrative films perform better in knowledge transfer and attentional control [Boy et al., 2020].

Interestingly, although these choices appear to be in conflict, they could represent a new way of representing science: using powerful images rooted in the documentary legacies [León, 2010] but also using animation or a mix of genres. Watching the five best-ranked videos, we found a combination of both styles, proving that a balance between authentic images and animation would be a good choice. Video abstracts could merge these two formats: the more classic ones, linked with television, like expert films or explanatory narrative films, with formats more connected to digital platforms like animations [Boy et al., 2020]. Davis and co-authors [2020] proved that an infotainment version of their video, rather than the expository version, was more effective for an audience not engaged with science [Davis et al., 2020]. Video abstracts could walk on this line and be an effective science communication tool, balancing the informative/traditional and the entertaining/innovative [Pavelle & Wilkinson, 2020].

Production was the second most-liked category (Figure 6). The first highlights were the video features (Figure 7) mentioned by the panel and grouped into: i) Clarity; ii) Objectivity; iii) Creativity; iv) Dynamism, and (v) Information. A video abstract has to be clear, concise and compact. Furthermore, it must convey ideas accurately in an objective and simple way. This aligns with the conceptual model of SciComercial video, which aims to produce content that, among other characteristics, is simple and concrete [Finkler & Leon, 2019]. Creativity and novelty are also important when we think about our video [Erviti & Stengler, 2016], associated with more widespread and disruptive formats like animation [Ferreira et al., 2021], as already discussed above. Linked to creativity is the humorous tone that was referred to as one of the most liked features and showed that humour could make a difference [Erviti & Stengler, 2016]. Finally, the dynamism aligns with the evidence that more static formats, such as slideshows (e.g., video nº 33), were not appreciated (Figure 1) and were not seen as actual video abstracts. Also, the more extensive expression of the subcategory Format on the least appreciated features shows us that monologues and simple presentations were poorly received (Figure 8).

Production phases were also referred to, focusing on the editing process. This choice sustains the importance of having, on one side, a design with all work steps and, on the other, the possibility to work with specialized professionals. Editing is like directing a movie for the second time [Vachon, 2018] and could change a movie's complete perception and reception; it should not be depreciated.

Presentation was the category appearing most prevalently in the most and least favoured (Figure 6 and Figure 8). The narration features were the most mentioned, showing that a good narration and a good narrator are recognized. Narration and

the presence of a research presenter are also ways a science video legitimizes itself with the audience [León, 2010]. A video abstract that presents the scientist explaining their research acquires authenticity, a central element in the success of a science video [Kaul, Schrögel & Humm, 2020]. The importance of a good voice is linked with the audio category. As stated in previous literature, sound is rarely mentioned when it is good (Figure 6) [Vachon, 2018]. When it is not good, the sound is a critical negative factor in the viewing experience (Figure 8). This finding aligns with the conclusion that research is less positively evaluated when the sound is terrible [Newman & Schwarz, 2018].

Finally, the score of our video was very favourable compared to the rest of the sample. The positive reviews highlighted the diversity of content, clarity and editing. These results show us that working collaboratively, using resources available by the institutions (e.g. university), and mixing different formats (e.g. interview, documentary, animation) are winning formulas. In the future, researchers can consider producing videos based on the following proposed guidelines (Figure 9) towards a more effective way of communicating science.

Constraints

Like other reception studies, there was no opportunity to conduct discourse analysis on the comments associated with the videos: nine videos had no comments, so we could not compare this measure of viewer participation with the contributions from our panel experts for each video. In addition, working with a specific panel of specialists had limitations. It was not possible to generalize the effects to a general audience. Also, the content factors of these video abstracts cannot be applied to other scientific areas. Lastly, the selection of the 21 videos and content analysis was performed by a single researcher, which can bias the results regarding representativeness and reliability.

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Appendix A. Questionnaire on science video viewing habits and video abstract importance

1. How often do you watch science videos (a science video is a short audio-visual format with scientific content, which aims to reach a wider audience, using resources that adapt scientific aspects to the general public, keeping its rigour and precision)?
   - Very often
   - Often
   - Sometimes
   - Rarely
   - Never
   - Do not know/Do not answer

2. Do you consider that the existence of a video abstract benefits the dissemination of your research?
   - Yes
   - No
   - Do not know/Do not answer
3. If you answer "yes" to the previous question, tell us why?

Appendix B. Categories and subcategories resultant from content analysis

1. Audio
   a. Sound: references to sound or music;
   b. Sound Features: description of the sound attributes;
2. Presentation
   a. Narration and Presentation: involves the process of presentation and narration and its actors (e.g., narrative, narrator, presenter, explanation, exposition, presentation, speech and language);
   b. Narration and Presentation Features: evaluation of presentation and narration process;
   c. Narration and Presentation Dynamics: contains some details of the process of presentation and narration;
3. Topic
   a. Theme and Content: comprises all references associated with the topic (e.g., theme, premise, content, idea and information);
   b. Theme and Content Features: involves the attributes of the theme and content;
   c. Video Moments: comprises the references to a specific act of the video (e.g., conclusions, results, introduction, beginning, methodology, fact sheet and credits);
   d. Video Sections Features: includes the characteristics of the previous subcategory;
4. Visual Resources
   a. Images: comprises all the references to the used footage (e.g. videos, photos and images, in a general or specific way);
   b. Images Features: includes the characteristics of images and videos;
   c. Animations: this subcategory includes all references to animations (e.g. infographics, drawings, graphics and stop-motion);
   d. Animations Features: comprises all adjectives that classify animations and their use;
   e. Graphic Elements: includes all the secondary resources that support the video (e.g., maps, diagrams, subtitles, titles and text);
   f. Graphic Elements Features: comprises the features of the previous subcategory;

5. Production
    a. Format: indicates the chosen format (e.g., documentary, interview, PowerPoint presentation)
    b. Duration: comprises all the references to the length of the video and its features;
    c. Production Stages: this subcategory includes every concept related to production, editing, resources, filming areas, structure, organization, script, editing and sets;
    d. Video Features: comprises general or specific video traits.
6. Don't know/Don't answer
7. Nothing

References

Allgaier, J. (2019). Science and environmental communication on YouTube: strategically distorted communications in online videos on climate change and climate engineering. *Frontiers in Communication 4*, 36. doi:10.3389/fcomm.2019.00036

Allgaier, J. & Landrum, A. R. (Eds.) (2022). *New directions in science and environmental communication: understanding the role of online video-sharing and online video-sharing platforms for science and research communication*. doi:10.3389/978-2-88974-364-3

Almeida, C. & Almeida, P. (2021). From the living room to the classroom and back — production guidelines for science videos. In M. J. Abásolo, J. Abreu, P. Almeida & T. Silva (Eds.), *Applications and usability of interactive TV* (pp. 77–88). 9th Iberoamerican Conference, jAUTI 2020. Aveiro, Portugal. doi:10.1007/978-3-030-81996-5_6

Amado, J. S. (2000). A técnica da análise de conteúdo. *Revista de Enfermagem Referência 5*, 53–63. Retrieved from https://rr.esenfc.pt/rr/index.php?module=rr&target=publicationDetails&pesquisa=&id_artigo=2049&id_revista=5&id_edicao=20

Angelone, S. (2019). A new generation of scientists-as-filmmakers: experiences gained in Switzerland. *Science Communication 41* (3), 369–377. doi:10.1177/1075547019837620

Angelone, S., Soriguer, R. C. & Melendo, A. (2020). Filmmaking courses for scientists help promote richer alternatives to chronological narratives. *Studies in Higher Education 45* (9), 2001–2010. doi:10.1080/03075079.2019.1604651

Beautemps, J. & Bresges, A. (2021). What comprises a successful educational science YouTube video? A five-thousand user survey on viewing behaviors and self-perceived importance of various variables controlled by content creators. *Frontiers in Communication 5*, 600595. doi:10.3389/fcomm.2020.600595

Bell, S. A. (2020). Social media for ecologists: YouTube. In *Social media for ecologists: improving your impact and engagement across platforms*. London, U.K.: British Ecological Society.

Berkowitz, J. (2013). Video abstracts, the latest trend in scientific publishing. *University Affairs*. Retrieved from https://www.universityaffairs.ca/features/feature-article/video-abstracts-the-latest-trend-in-scientific-publishing/

Bonnevie, T., Repel, A., Gravier, F.-E., Ladner, J., Sibert, L., Muir, J.-F., … Fischer, M.-O. (2023). Video abstracts are associated with an increase in research reports citations, views and social attention: a cross-sectional study. *Scientometrics 128* (5), 3001–3015. doi:10.1007/s11192-023-04675-9

Boy, B., Bucher, H.-J. & Christ, K. (2020). Audiovisual science communication on TV and YouTube. How recipients understand and evaluate science videos. *Frontiers in Communication 5*, 608620. doi:10.3389/fcomm.2020.608620

Bredbenner, K. & Simon, S. M. (2019). Video abstracts and plain language summaries are more effective than graphical abstracts and published abstracts. *PLoS ONE 14* (11), e0224697. doi:10.1371/journal.pone.0224697

Brennan, E. B. (2021). Why should scientists be on YouTube? It's all about bamboo, oil and ice cream. *Frontiers in Communication 6*, 586297. doi:10.3389/fcomm.2021.586297

Bucchi, M. & Trench, B. (2021). Introduction: science communication as the social conversation around science. In M. Bucchi & B. Trench (Eds.), *Routledge handbook of public communication of science and technology* (3rd ed., pp. 1–13). doi:10.4324/9781003039242

Chan, G. (2019). Low cost film making [Film-making course presented at Science Retreats, Évora, Portugal]. Retrieved from https://www.scienceretreats.com/lowcostfilmmaking

Clarivate Analytics (2018). *Journal Citation Reports: 2017 Journal Impact Factor*.

Davis, L. S., León, B., Bourk, M. J. & Finkler, W. (2020). Transformation of the media landscape: infotainment versus expository narrations for communicating science in online videos. *Public Understanding of Science 29* (7), 688–701. doi:10.1177/0963662520945136

Debove, S., Füchslin, T., Louis, T. & Masselot, P. (2021). French science communication on YouTube: a survey of individual and institutional communicators and their channel characteristics. *Frontiers in Communication 6*, 612667. doi:10.3389/fcomm.2021.612667

Díaz, S., Settele, J., Brondízio, E. S., Ngo, H. T., Guèze, M., Agard, J., … Zayas, C. N. (Eds.) (2019). *IPBES (2019): summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. doi:10.5281/zenodo.3553579

Donhauser, D. & Beck, C. (2021). Pushing the Max Planck YouTube channel with the help of influencers. *Frontiers in Communication 5*, 601168. doi:10.3389/fcomm.2020.601168

Dubovi, I. & Tabak, I. (2021). Interactions between emotional and cognitive engagement with science on YouTube. *Public Understanding of Science 30* (6), 759–776. doi:10.1177/0963662521990848

Entradas, M. (2022). Public communication at research universities: moving towards (de)centralised communication of science? *Public Understanding of Science 31* (5), 634–647. doi:10.1177/09636625211058309

Erviti, M. C. (2018). Producing science online video. In B. León & M. Bourk (Eds.), *Communicating science and technology through online video: researching a new media phenomenon* (pp. 28–40). doi:10.4324/9781351054584

Erviti, M. C. & Stengler, E. (2016). Online science videos: an exploratory study with major professional content providers in the United Kingdom. *JCOM 15* (06), A06. doi:10.22323/2.15060206

Ferreira, M., Lopes, B., Granado, A., Freitas, H. & Loureiro, J. (2021). Audio-visual tools in science communication: the video abstract in ecology and environmental sciences. *Frontiers in Communication 6*, 596248. doi:10.3389/fcomm.2021.596248

Ferreira, M., Lopes, B., Granado, A., Siopa, C., Gaspar, H., Castro, H., … Loureiro, J. (2023). Video abstract production guide. *Frontiers in Communication 8*, 1060567. doi:10.3389/fcomm.2023.1060567

Ferreira, M., Loureiro, J., Granado, A. & Lopes, B. (2023). New strategies in science education? The use of video abstracts in ecology and environmental sciences in the classroom. *APEduC Journal 4* (1), 13–26. doi:10.58152/APEduCJournal.316

Finkler, W. & Leon, B. (2019). The power of storytelling and video: a visual rhetoric for science communication. *JCOM 18* (05), A02. doi:10.22323/2.18050202

Fiolhais, C. (2016). *A ciência em Portugal*. Lisboa, Portugal: Fundação Francisco Manuel dos Santos.

Fontes, D. T. M. (2021). Uma comparação das visualizações e inscrições em canais brasileiros de divulgação científica e de pseudociência no YouTube. *JCOM – América Latina 04* (01), A01. doi:10.22323/3.04010201

Galliers, R. D. & Huang, J. C. (2012). The teaching of qualitative research methods in information systems: an explorative study utilizing learning theory. *European Journal of Information Systems 21* (2), 119–134. doi:10.1057/ejis.2011.44

García-Avilés, J. A. & de Lara, A. (2018). An overview of science online video: designing a classification of formats. In B. León & M. Bourk (Eds.), *Communicating science and technology through online video: researching a new media phenomenon* (pp. 15–26). doi:10.4324/9781351054584

Hoang, L. N. (2020). Science communication desperately needs more aligned recommendation algorithms. *Frontiers in Communication 5*, 598454. doi:10.3389/fcomm.2020.598454

Huang, T. & Grant, W. J. (2020). A good story well told: storytelling components that impact science video popularity on YouTube. *Frontiers in Communication 5*, 581349. doi:10.3389/fcomm.2020.581349

IPCC (2023). Summary for policymakers. In *Climate Change 2022 — Impacts, adaptation and vulnerability: Working Group II contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. doi:10.1017/9781009325844

Jamali, H. R., Nabavi, M. & Asadi, S. (2018). How video articles are cited, the case of JoVE: *Journal of Visualized Experiments*. *Scientometrics 117* (3), 1821–1839. doi:10.1007/s11192-018-2957-6

Kalmár, É. & Stenfert, H. (2020). Science communication as a design challenge in transdisciplinary collaborations. *JCOM 19* (04), C01. doi:10.22323/2.19040301

Kaul, L., Schrögel, P. & Humm, C. (2020). Environmental science communication for a young audience: a case study on the #EarthOvershootDay campaign on YouTube. *Frontiers in Communication 5*, 601177. doi:10.3389/fcomm.2020.601177

Kippes, R. (2021). El videoartículo como recurso narrativo clave para la comunicación de la ciencia en los nuevos entornos digitales. *JCOM – América Latina 04* (01), A06. doi:10.22323/3.04010206

Kwok, R. (2018). Put it on camera: how to get into scientific film- and video-making. *Nature 553* (7686), 117–119. doi:10.1038/d41586-017-08862-6

León, B. (2010). La ciencia en imágenes. Construcción visual y documental científico. *ArtefaCToS 3* (1), 131–149. Retrieved from https://revistas.usal.es/cinco/index.php/artefactos/article/view/8432
León, B. & Bourk, M. (2018). Investigating science-related online video. In B. León & M. Bourk (Eds.), *Communicating science and technology through online video: researching a new media phenomenon* (pp. 1–14). doi:10.4324/9781351054584
Maynard, A. D. (2021). How to succeed as an academic on Youtube. *Frontiers in Communication 5*, 572181. doi:10.3389/fcomm.2020.572181
Moreira, J. A. & Nejmeddine, F. (2015). *O vídeo como dispositivo pedagógico e possibilidades de utilização didática em ambientes de aprendizagem flexíveis*. Santo Tirso, Portugal: WhiteBooks.
Muñoz Morcillo, J., Czurda, K. & Robertson-von Trotha, C. Y. (2016). Typologies of the popular science web video. *JCOM 15* (04), A02. doi:10.22323/2.15040202
Newman, E. J. & Schwarz, N. (2018). Good sound, good research: how audio quality influences perceptions of the research and researcher. *Science Communication 40* (2), 246–257. doi:10.1177/1075547018759345
Olson, R. (2018). *Don't be such a scientist: talking substance in an age of style*. doi:10.5822/978-1-61091-918-0
Palma, M., Tavares, L. C., Rito, J., Henriques, L. F., Silva, J. G., Ozório, R., … Viegas, I. (2019). Metabolic effects of dietary glycerol supplementation in muscle and liver of European seabass and rainbow trout by 1H NMR metabolomics. *Metabolites 9* (10), 202. doi:10.3390/metabo9100202
Palys, T. (2008). Purposive sampling. In L. M. Given (Ed.), *The SAGE encyclopedia of qualitative research methods* (Vol. 2, pp. 697–698). doi:10.4135/9781412963909
Pavelle, S. & Wilkinson, C. (2020). Into the digital wild: utilizing Twitter, Instagram, YouTube, and Facebook for effective science and environmental communication. *Frontiers in Communication 5*, 575122. doi:10.3389/fcomm.2020.575122
Plank, M., Molnár, A. D. & Marín-Arraiza, P. (2017). Extending media literacy education: the popular science video workshop. IFLA World Library and Information Congress: 83rd IFLA General Conference and Assembly — Libraries. Solidarity. Society. Wrocław, Poland. doi:10.34657/625
Rosenthal, S. (2020). Media literacy, scientific literacy, and science videos on the Internet. *Frontiers in Communication 5*, 581585. doi:10.3389/fcomm.2020.581585
Ruzi, S. A., Lee, N. M. & Smith, A. A. (2021). Testing how different narrative perspectives achieve communication objectives and goals in online natural science videos. *PLoS ONE 16* (10), e0257866. doi:10.1371/journal.pone.0257866
Shaikh, A. R., Alhoori, H. & Sun, M. (2023). YouTube and science: models for research impact. *Scientometrics 128* (2), 933–955. doi:10.1007/s11192-022-04574-5
Slemmons, K., Anyanwu, K., Hames, J., Grabski, D., Mlsna, J., Simkins, E. & Cook, P. (2018). The impact of video length on learning in a middle-level flipped science setting: implications for diversity inclusion. *Journal of Science Education and Technology 27* (5), 469–479. doi:10.1007/s10956-018-9736-2
Smith, A. A. (2020). Broadcasting ourselves: opportunities for researchers to share their work through online video. *Frontiers in Environmental Science 8*, 150. doi:10.3389/fenvs.2020.00150

Spicer, S. (2014). Exploring video abstracts in science journals: an overview and case study. *Journal of Librarianship and Scholarly Communication 2* (2), eP1110. doi:10.7710/2162-3309.1110

Thelwall, M., Kousha, K., Weller, K. & Puschmann, C. (2012). Chapter 9: Assessing the impact of online academic videos. In G. Widén & K. Holmberg (Eds.), *Social information research* (pp. 195–213). doi:10.1108/s1876-0562(2012)0000005011

Vachon, R. (2018). *Science videos: a user's manual for scientific communication*. doi:10.1007/978-3-319-69512-9

Vasquez-Muriel, D. & Escobar-Ortiz, J. M. (2022). Does democratizing access to science imply democratizing science? A case study of non-corporate Spanish-speaking science YouTubers. *JCOM 21* (03), A02. doi:10.22323/2.21030202

Velho, R. M. & Barata, G. (2020). Profiles, challenges, and motivations of science YouTubers. *Frontiers in Communication 5*, 542936. doi:10.3389/fcomm.2020.542936

Velho, R. M., Mendes, A. M. F. & Azevedo, C. L. N. (2020). Communicating science with YouTube videos: how nine factors relate to and affect video views. *Frontiers in Communication 5*, 567606. doi:10.3389/fcomm.2020.567606

Weingart, P. (2022). Trust or attention? Medialization of science revisited. *Public Understanding of Science 31* (3), 288–296. doi:10.1177/09636625211070888

Welbourne, D. J. & Grant, W. J. (2016). Science communication on YouTube: factors that affect channel and video popularity. *Public Understanding of Science 25* (6), 706–718. doi:10.1177/0963662515572068

Xu, S., Yu, H., Hemminger, B. M. & Dong, X. (2018). Who, what, why? An exploration of JoVE scientific video publications in tweets. *Scientometrics 117* (2), 845–856. doi:10.1007/s11192-018-2880-x

Yang, S., Brossard, D., Scheufele, D. A. & Xenos, M. A. (2022). The science of YouTube: what factors influence user engagement with online science videos? *PLoS ONE 17* (5), e0267697. doi:10.1371/journal.pone.0267697

Zong, Q., Xie, Y., Tuo, R., Huang, J. & Yang, Y. (2019). The impact of video abstract on citation counts: evidence from a retrospective cohort study of New Journal of Physics. *Scientometrics 119* (3), 1715–1727. doi:10.1007/s11192-019-03108-w

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