



Faceless giants

The role of science institutions on YouTube

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1. INTRODUCTION

Every day, millions of people connect to the internet to communicate with others and understand what's happening in the world around them. I am one of them.

In the last twenty years, a particular kind of website, the social network, has grown to enormous success and now dominates the way people use the internet. Many use social networks as their menu to the online world, a platform that aggregate all the things they are interested in.

Social networks are not neutral – as no medium is. They are accessible and free to use, but are also based on complex algorithms and designed to make profit out of users.

We are so used to communicate through social media that we immediately realize when someone is using them wrong, like when a politician replies with abusive tweets to his followers or a company launches a contest for viral content posting an awfully produced video; sometimes, it seems that professional communicators are less aware than common users of the rules of internet platforms.

Personally, I'm an avid social media user (Facebook, YouTube, Twitter, Reddit etc.), and I've experienced first-hand that, sometimes, companies and institutions that use social media like YouTube are not interested in producing platform-specific content – or even adapting content they already have for new platforms. However, these websites can be used to reach a wide audience, as many amateurs and professionals are doing.

In the next pages, I will examine how YouTube as a social media is used in science communication, and what can we do to use it better.

2. SCIENCE AND YOUTUBE: AN OVERVIEW

YouTube and its Creators

YouTube is a video sharing platform founded in 2005 by former PayPal employees Chad Hurley, Steve Chen, and Jawed Karim, and bought by Google in 2006. In the twelve years of its life, it's grown to be one of the most visited websites (according to the Alexa ranking, it's currently the second most visited website¹ on the Internet); according to YouTube LLC, the platform has over a billion users – meaning that one in three people connected to the Internet uses it – and offers content in 76 different languages². Probably, one of the reasons of its success was that, unlike other video sharing websites, all its videos were playable immediately using Flash Player (already installed on almost all computers); instead, the other platforms required users to download plugins and software, a process that in 2005 could take hours³. In a time when internet connection was slower, YouTube became the top video website providing a service accessible to everyone.

It's estimated that every minute, 400 hours of footage are uploaded on YouTube⁴, generating an impossibly large amount of visual information. But who are the people uploading content on YouTube?

The first video ever uploaded, a nineteen-second take of co-founder Jared Karim at the San Diego Zoo, is the epitome of one of the most common YouTube content: the home video. Shot with a low-res camera and showing Karim, in front of the elephant exhibit, saying that “they have really, really, really long trucks...and that's cool”⁵: unpolished and noisy, the video sets the tone for the vast majority of footage on the website. The idea that YouTube was an ideal home to user-generated content, meant to be consumed by the user's friends and family, was reinforced by the website slogan, *Broadcast Yourself* (discontinued in 2012).

¹ [youtube.com Traffic Statistics](#), Alexa. Retrieved on 11/12/2016

² [Statistics](#), YouTube. Retrieved on 11/12/2016

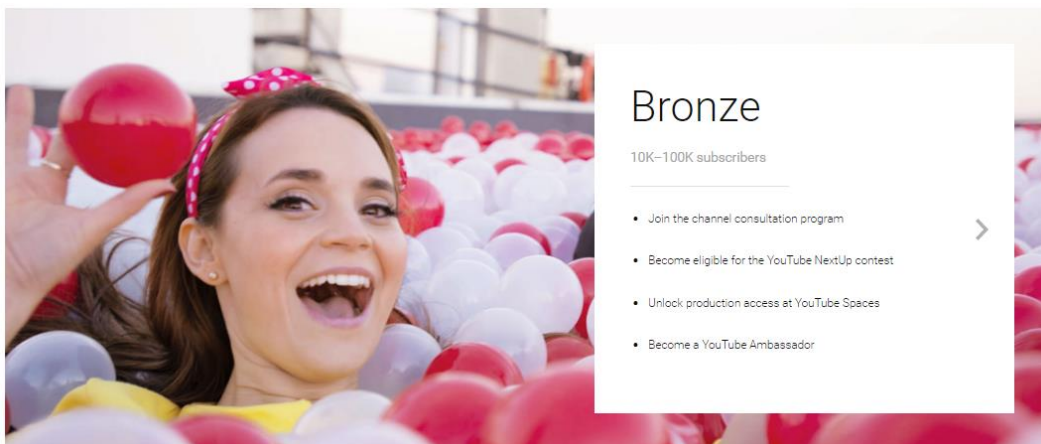
³ The Game Theorists, [From Paperbacks to PewDiePie: the history of Let's Plays](#), YouTube

⁴ G. Jarboe, [Vidcon 2015 haul: trends, strategic insights, critical data](#), Tubular Insights

⁵ J. Karim, [Me at the Zoo](#), YouTube

Unsurprisingly, the videos uploaded by amateur users rarely draw much traffic to the website. For example, until 2015⁶, when a video scored 301 views, the counter “froze” to check for bots and filter view fraud; indeed, the website calculated that most user-generated videos wouldn’t get more than a hundred views, and the value was set as a limit of “success”. After the service was acquired by Google in 2006, the company implemented video monetization and advertisement partnerships, making the platform appealing to traditional media outlets, companies and established celebrities. Film and music distribution companies, as well as television channels, use YouTube as an additional platform to publish content already produced for traditional media or their websites (such as music videos and movie trailers).

However, YouTube has seen the rise of some new, platform-specific genres and production methods, that in the last years have gained recognition from the traditional media too: their personification is the *youtuber*. Youtubers are, often, young users that design their channel content for an audience of peers; YouTube itself is well aware of the potential of these amateurish producers, defined **creators**, and offers a benefit program that include courses, workshops and accessibility to production spaces, available to channels that already have a fan-base of one thousand subscribers or more⁷. Although, technically, everyone managing a YouTube channel is a youtuber, this term is commonly used only to identify those people that become an internet celebrity and get a significant revenue out of their online activity. In this study, the term youtuber will be used as a synonym of YouTube creator.



YouTube offers different benefit levels: Graphite (regular users to 1k subscribers), Opal (1000 to 10k subscribers), Bronze (10k to 100k) and Silver (over 100k); benefits include up to a personal partner manager.

⁶ J. Kastrenakes, [YouTube videos will no longer get stuck at 301+ views](#), The Verge

⁷ [Benefit levels](#), YouTube

To the most dedicated users, the face of YouTube is the one of the creator. While the official channels of singers – for example – may be very popular in terms of view count, creator channels have stunning amounts of subscribers. This means that many users, instead of browsing the website for specific content, want to see updates from the people they trust and care about, and that often assume the role of curators (since, on YouTube, you can see a list of other videos watched or liked by a user). Subscribers are an active community that spills the discussion on their favorite channels over multiple social platforms, like Twitter and Twitch (a platform dedicated to video game streams); they are so involved in the lives and troubles of creators that they not only discuss about the content, but also about the platform algorithms and monetization policies, even acting as an amplifier of the creators' discontent⁸.

What is perhaps one of the clearest examples of this relationship is the success of a genre that was born with YouTube: the *videogame Let's Play*. In a *Let's Play*, you simply watch youtubers play a game, listening to their commentary and chit-chat; and usually, it takes multiple videos and *a lot* of time. Some of the most popular channels fall in this category: for example, the first YouTube channel for number of subscribers (a whopping 49 million people), *PewDiePie*. While the genre was born as a way to offer a “visual guidebook” for gamers struggling to solve puzzles, for many subscribers the experience is more similar to an afternoon playing videogames with a friend.

Videogames are one of the most followed topics on the website, along with music, sports, film and TV. However, other popular categories include science, pop culture and education.

⁸ F. Eordogh, [Making Sense Of YouTube's Great Demonetization Controversy Of 2016](#), Forbes. Retrieved on 26/11/2016



A Let's Play video from the PewDiePie YouTube channel. While the youtuber is playing the videogame, a front camera records his reactions in real time.

Science on YouTube

Science-themed channels get millions of followers too. They come in a great variety of formats, from the online lectures of *Kahn Academy* to the short stick-figure animations of *MinutePhysics*. Many of the channels with a huge following, like *AsapSCIENCE* and *SciShow*, follow the model of the **pop science video**: short, informative bites that answer to common questions about our world and science, like “Why is the sky blue?”, “How much pain can you handle?” or “Why do cats love boxes?”. Often, pop science videos are shorter than five minutes, have simple animations, and feature the familiar face – or voice – of a young youtuber.

Not all YouTube science, however, is made for short attention spans and people looking for *mind-blowing facts*. *Vsauce*, for example, is probably the most popular science-related channel, counting 11 million subscribers and over a billion total views⁹. Its videos cover many topics, from mathematics

⁹ [About Vsauce](#), YouTube. Retrieved on 26/11/2016

to linguistics, are remarkably well-documented, interdisciplinary and long – sometimes up to 25 minutes.



Most of AsapSCIENCE videos are based on whiteboard animation; other effects are added in post-production.

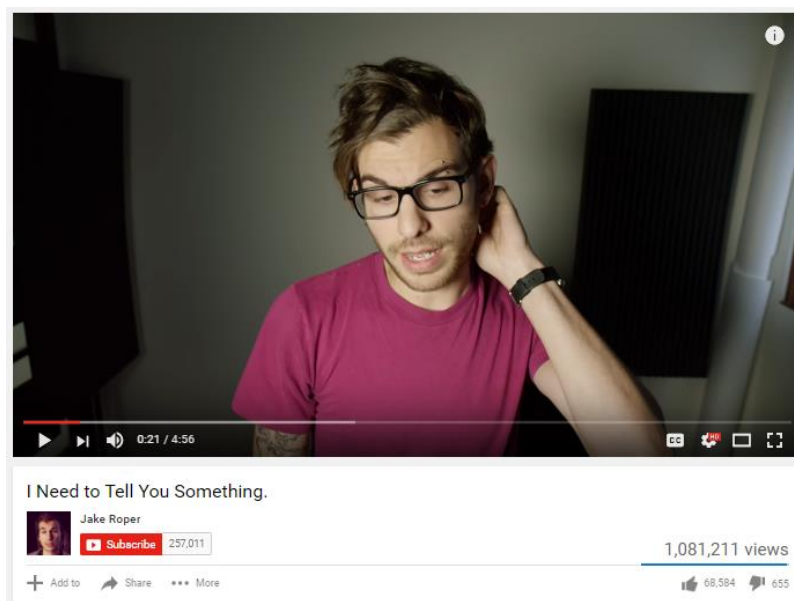
However, all popular (in the sense of *famous*) science-related YouTube channels have one thing in common: **they are all created by youtubers**. And while this may be expected if we're talking about video games, a relatively new medium that still has to enter the world of academia and mainstream entertainment, it's surprising if we're referring to science and education, where institutions (like universities and research centers) already have an established role in popularization and outreach.

Many of these youtubers are science graduates, former researchers (Henry Reich of *MinutePhysics*), journalists (Brady Haran of *Periodic Videos* and *Numberphile*) and even former comedians (Michael Stevens of *Vsauce*, who worked on *CollegeHumor* and *Funny or Die*). While they may not have a for-

mal education on science communication, most of them are storytelling experts¹⁰. They may be compared to freelance journalists that, instead of writing on magazines and newspaper, write and shoot video for YouTube.

The science communicators behind these channels have a lot in common with other YouTube celebrities – even if their videos aren't make up tutorials and videogame walkthroughs. Many have a section of their channel (or a sister channel) dedicated to personal vlogs, Q&As with their followers and updates on their personal lives, that are often equally popular as the science videos. *AsapSCIENCE*, for example, is paired by *AsapTHOUGHT*, with personal updates from the youtubers behind the channel, Mitchell Moffit and Gregory Brown, as well as videos on social issues and life tips. Their “online coming out” video¹¹, one of the most popular on the channel, has over a million views.

The key to the success of these science communicators on YouTube seems to be the ability to **create a relationship** with their viewers. This is not a new concept: every piece of communication, from the news report to the two-hour long documentary, needs to establish a personal connection with the audience. What's new is the platform: YouTube is a **social network**, an online community with a specific set of rules; and as with every other media, if you don't know how it works, you probably won't have much success.



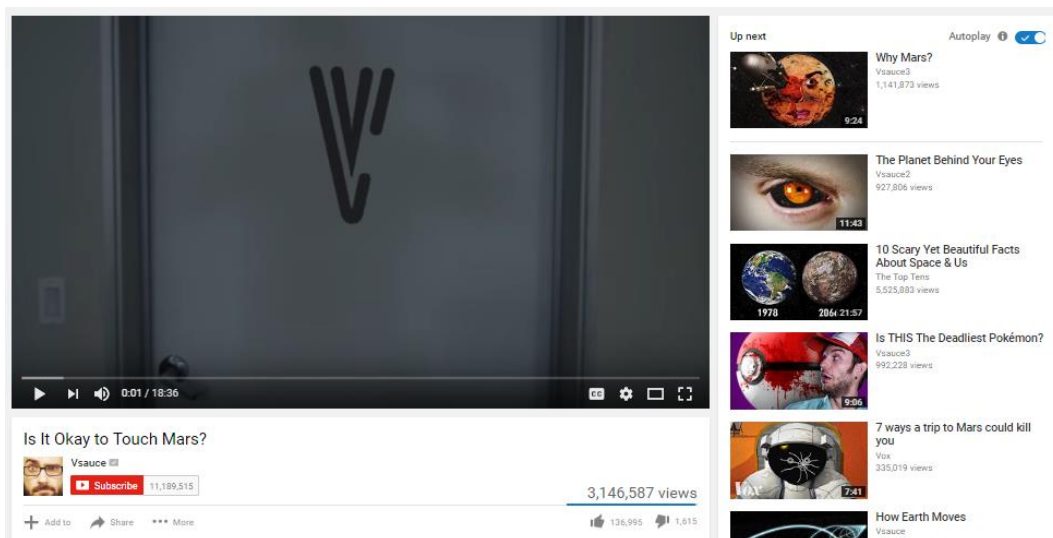
Youtuber Jake Roper (Vsauce3) talks about being diagnosed with cancer in a video on his personal channel.

¹⁰ Morcillo et al., 2015

¹¹ AsapTHOUGHT, [Coming Out Twice](#), YouTube. Retrieved on 26/11/2016

YouTube, the social network

The rules of YouTube are not set in stone. The website is under constant renovation, and every few months there are changes to the algorithms and monetization policies. While traditional media like TV channels and magazines – even online magazines – have a team of editors and curators that decide on content visibility (for example, setting the order of news reports or deciding which articles are worthy of being posted repeatedly on social media), social media like YouTube and Facebook have algorithms that manage, to some degree, which content should get **more or less visibility**. On YouTube, videos that are considered worthy are more suggested as *related content* to users, and featured on the website homepage as *trending*. The algorithm – and the website revenues – rely on a **snowball effect**: if the system is able to detect videos that are actually pleasant to many users, their success builds upon itself, generating more and more views¹².



The list of suggested videos is shown to the right.

While the algorithm itself is a trade secret, some experiment to reverse engineer it revealed that the features that the YouTube algorithm favors most are **interaction** and velocity (a rapid growth in view count in the first hours

¹² Figueiredo et al., 2011; Szabo and Hiberman, 2010; Zhou et al., 2010.

from the upload)¹³. While advertisement revenue comes only from views, the key to be picked up by the algorithm and be given visibility on the website is to get a high ratio of subscriptions, likes, dislikes, comments and shares on other platforms. This means that successful videos are the ones that cause reactions, and that draw views making the most of the thumbnail and title¹⁴.

This also means that video makers are motivated to ask for likes and subscriptions to their channel, or to ask their viewers for comments. Instead of appearing as a cheap trick to get visibility, youtubers have transformed this beg for interaction in a way to make their audiences feel included: many ask personal opinions – like “What topics do you want me to talk about?” or “When did you first start to follow my channel?” – or organize giveaways and lotteries among the commenters.

However, this need to hear the voice of the viewers can also become a powerful tool for data collection. Every video maker that uses YouTube has direct access to the information on the audience’s behavior on their channel – such as traffic, watch duration, subscriptions driven by an individual video and more, and can decide to use this information to improve or shape their relationship with the viewers.

We have seen that the environment of YouTube is shaped by algorithms and users’ interactions, that make it inherently different from a proprietary website, the structure of which can be reorganized accordingly to personal needs. For example, many broadcast media and institutions – such as TV channels and museums – offer an online TV service on their websites, and can decide which videos are featured on the home page or on other highly visible locations. On the contrary, on YouTube it’s possible to pin and organize videos on the channel profile page (creating playlists), but it’s more difficult to control what content gets more visibility on the website in general. The environment is huge: there’s competition with many other channels, but it’s also really easy for users to have access to content related to their interests; so, it becomes extremely important to know how to classify and tag uploaded content to make it most accessible to viewers already on the website.

¹³ M. Gielen and J. Rosen, [Reverse Engineering the YouTube Algorithm](#), TubeFilter. Retrieved on 26/11/2016

¹⁴ Recent changes in the YouTube algorithm suggest that channel performances may now be strongly influenced by longer watch times and release of content every day, to increase viewers’ fidelity to the website. The Game Theorists, [The REAL Reason YouTube is Broken](#), YouTube, retrieved 26/12/2016

Why should science institutions care about social media?

A recent report by the Pew Research Center showed that, in the U. S., **62% of adults get their news from social media**, mostly from Facebook (44% of the population)¹⁵. YouTube comes in second, with 10% of the population using it as a news source. While social networks are still used along TV, newspapers and radio by the adult population, another 2016 report from the Pew Research Centers shows that young adults are more likely to get their news only online¹⁶, so the relevance of the web can be expected to grow more and more in the future.

Moreover, many people use social networks to browse all the content they're interested in using only one platform; organizations like Facebook and YouTube, on their hand, are doing everything they can to maximize the time spent by users on the same platform, struggling to provide access to different services.

What is more troubling is that, on social media, many people have a passive attitude towards news, in the sense that they are **exposed** to them while browsing the platform, and are not actively seeking specific content (this happens particularly on Facebook, Instagram and YouTube, while LinkedIn, Twitter and Reddit users are more active)¹⁷. Therefore, if you're spending time on Facebook to check on your friends' photos, you are likely to see news stories shared by your circle of contacts; as for YouTube, the visibility of content on Facebook is managed by algorithms that don't necessarily present you with the best and most trustworthy sources on information.

This passive attitude can lead to live in the so-called **filter bubble**; many social networks work with positive feedbacks - making sure that you continuously *like what you see* and don't stumble on content you are uncomfortable with.

The majority of social network still has no filter for the quality of news content, meaning that **fake and low-quality information** can spread as easily

¹⁵ J. Gottfried and E. Shearer, [News Use Across Social Media Platforms 2016](#), Journalism.org. Retrieved on 26/11/2016

¹⁶ A. Mitchell, J. Gottfried, M. Barthel and E. Shearer, [The modern news consumer – Young Adults](#), Journalism.org. Retrieved on 26/11/2016

¹⁷ J. Gottfried and E. Shearer, 2016

as verified articles¹⁸. Science news are affected too: on Facebook, there are many active communities debating on the safety of vaccines or on the benefits of the blood type diet, sharing articles from unverified sources. On YouTube, channels like *The Vaccination Information Network* (that, despite the name, does not provide reliable information on vaccines) get hundreds of thousands of subscribers.

There is the need for content that is both good and built to thrive on social media; as of today, this content is produced by single people like youtubers: for example, searching on YouTube for terms like *anti-vax* and *vaccine problems*, the first videos to come up are “How risky are vaccines?” by *MinuteEarth*¹⁹ and “The science of anti-vaccination” by *SciShow*²⁰, both informing on the reasons of the debate but providing reliable medical information. Sadly, it becomes **extremely difficult**, even with a general research, **to find any educational or informative content produced by a scientific institution.**

Connecting with the public

Why is it a problem if science institutions get a smaller and smaller role in science communication? After all, the media – newspapers, online magazines, even youtubers – is already there to inform the public! Research institutions could just be the source of information for journalists.

The reasons for science institutions to try to establish a direct contact with the public using the internet are both material and ideological.

An active and dialogical presence on social media can help institutions to gain visibility and **relevance in the public debate**; if more and more citizens are aware that – and which – science research is happening in their neighborhood, they can be more active in lobbying for funding (in the case of

¹⁸ In the aftermath of two major political events in 2016 where fake news had a prominent role, Brexit and the U.S. Presidential election, websites like Facebook and Google are implementing ways to report untrustworthy sources; there is no automatic algorithm currently operative, though. For reference and commentary, see [Social Media Sites Can't Allow Fake News To Take Over](#), The Washington Post.

¹⁹ MinuteEarth, [How Risky Are Vaccines?](#), YouTube. Retrieved 11/12/2016

²⁰ SciShow, [The Science of Anti-Vaccination](#), YouTube, Retrieved 11/12/2016

public institutions) or directly contributing with donations (for private ones)²¹.

Social networks can also be as a powerful and rather inexpensive tool in the hands of researchers to create a relationship and **involve their communities**. They can be used to get back to the citizens the results of public founded research, but also to understand local issues and to shape future projects. The horizontal model of these platforms is an opportunity to start personal interactions between researchers and the public at the same level; as other inclusive initiatives like Pint of Science have shown, these personal connections can make a difference in the communities²².

Online spaces can also be a place left for the audience to freely express themselves. On social networks, it's extremely easy to produce, upload and share content: people are eager to comment, share their reactions and ideas when given the chance.

Or if given the chance. While a dialogical and aware use of social media has been adopted by many media outlets and companies (not without any controversies²³), research shows that many science institutions are still mostly using these platforms as a one-way media, re-posting the same informative content which is already on their websites.

In particular, studies on university communications have shown that, when using social media, most don't exploit its dialogical potential, for example blocking the comment features on content or even the possibility to write posts on the university profile (Acquilani and Lovari, 2008; Lovari, 2012; McAllister and Spooner 2011; Gordon and Berhow 2009).

As well as promoting a participation model in science, social media should be used with care also to shape the institutions' **online - and offline - image**. The internet is the most widely used way to search for information, and if we don't find any there, we assume that what we're looking for probably doesn't even exist. Moreover, we are profoundly influenced by our online experience: researchers argue that people associate the quality and functioning of institutions with their online experience of it²⁴. For example, if I'm trying to register for an appointment at the local hospital and find the website buggy, slow and not well-organized, I'll easily transfer the same judgment to the organization of the hospital itself. Besides, if I see that the

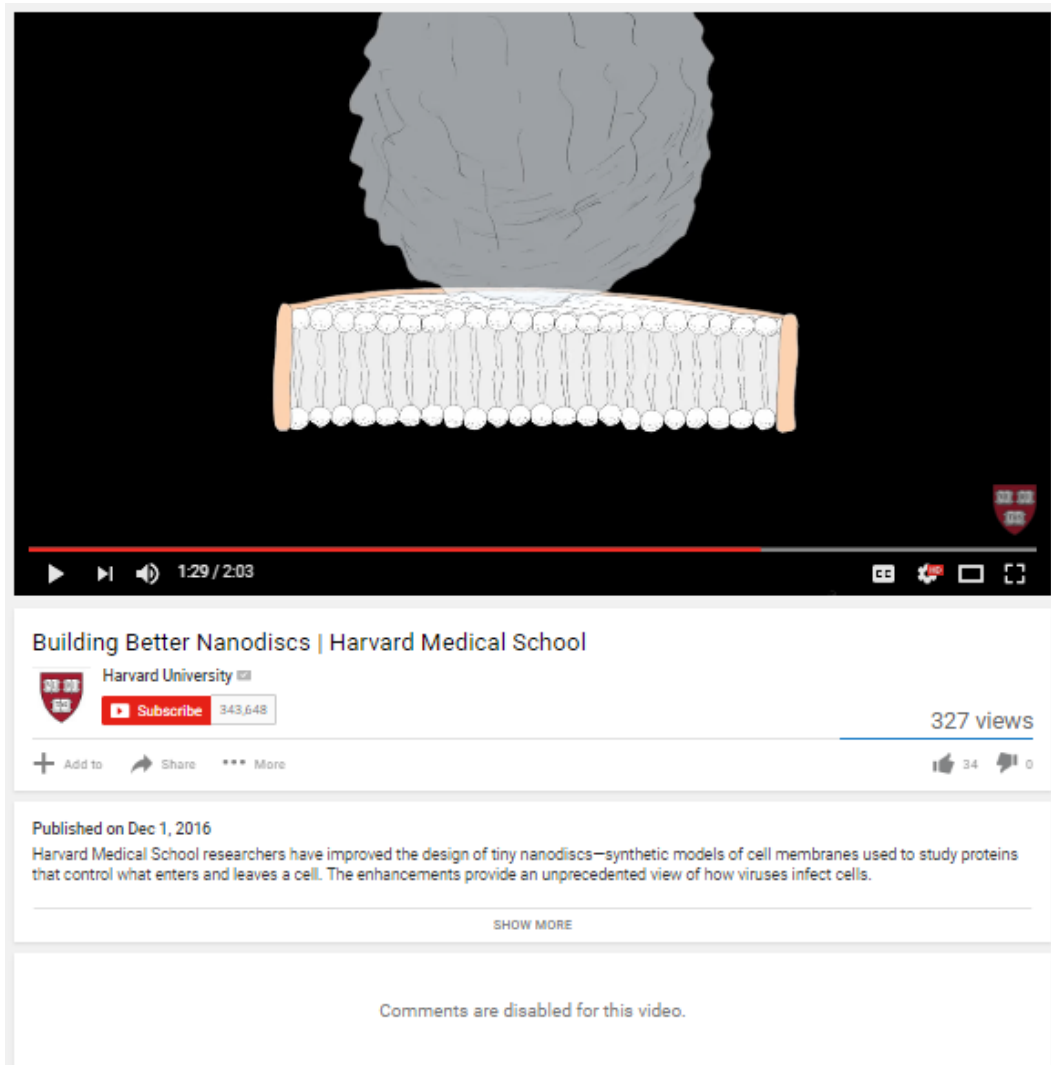
²¹ H. Rheingold, 2008

²² P. Praveen, 2016

²³ Last Week Tonight with John Oliver, [Corporations on Twitter](#), YouTube. Retrieved 11/12/2016

²⁴ Abrahamson, 2000

Facebook page of a public research center in my city has disabled comments and posts on their page, I'll probably conclude that, as an institution, they don't care about interacting with their community or any public in general.



The image shows a screenshot of a YouTube video player. The video content is a 3D illustration of a nanodisc, which is a synthetic model of a cell membrane. It consists of a flat, circular bilayer of phospholipids with a grey, textured protein embedded in the center. Above the nanodisc is a larger, grey, textured sphere. The video player interface includes a progress bar at 1:29 / 2:03, a play button, and a volume icon. Below the video player, the title "Building Better Nanodiscs | Harvard Medical School" is displayed, along with the Harvard University logo and a "Subscribe" button showing 343,648 subscribers. The video has 327 views and 34 likes. The description states: "Published on Dec 1, 2016 Harvard Medical School researchers have improved the design of tiny nanodiscs—synthetic models of cell membranes used to study proteins that control what enters and leaves a cell. The enhancements provide an unprecedented view of how viruses infect cells." Below the description is a "SHOW MORE" link. At the bottom of the video player, a message reads: "Comments are disabled for this video."

Comments are disabled on this science video from Harvard University.

3. LITERATURE REVIEW

Although the research on science communication on YouTube specifically is not huge, there are a few studies that set a starting point for further examinations.

Popularity

Welbourne and Grant (2015) examined content factors that affect channel and video popularity; content factors are defined as the “stylistic and informational characteristics of a video (e.g. topic, duration, delivery style)”, as opposed to content-agnostic factors (those external to the platform itself, such as the presence on other social media or news coverage). They analyzed the relationship of content factors with the YouTube popularity metrics; these factors were: video length, pace of speech and delivery style (e.g. continuity and gender of the communicator and video style). The results showed that only **communication continuity** and **pace of delivery** were related to an increase in popularity; the results also suggested that the **consistency in video style** could also affect popularity, even though the sample analyzed was too varied to show a certain correlation. The analysis also found that, contrarily to common belief, short videos are not more popular than long ones, and that neither views nor subscriptions are correlated with the age of the channel. Moreover, whether a video is professionally generated or user generated had no impact *per se* on subscriptions and views (even though they found user generated content to be usually more popular).

Borghol et al. (2012) defines a methodology to examine the effect of content-agnostic factors on video popularity; in particular, it shows the positive effects on popularity of: the use of keywords, first mover advantage (the first video uploaded on a particular content grows better than its *clones*), and uploader characteristics, such as an already strong social network.

There seems to be no consensus over the impact of veracity of the information presented and video popularity: while Keelan et al. (2007) holds that

reliable videos receive more favorable ratings than misleading content, other found no evidence of a correlation (Ache and Wallace, 2008; Murugiah et al., 2011, Pandey et al., 2010).

The great user-generated content debate

There is much debate regarding how to classify the origin of internet content; while many researchers use routinely the two main categories *user-generated* and *professionally-generated* (Borghol et al., 2012; Burgess and Green, 2009²⁵; Welbourne and Grant, 2015), these terms do not describe with accuracy the evolution of the web in the latest years.

For example, Kim (2012) describes the transformation of YouTube from the years of its foundation as *institutionalization*; the introduction of advertisement imitates the rules of traditional media (in particular, the legalized distribution of broadcasting content), and user-generated content is being replaced by professionally-generated content; however, the study does not consider that YouTube is being used by the so-called *amateurs* to **become professionals** of a new kind, making a revenue out of the ad-friendly environment initially implemented for corporations²⁶ but producing entirely different content.

The dualism between user-generated and professionally-generated, as a matter of fact, is **misleading**: for example, top youtubers may be considered part of the former category if considering style, but of the latter regarding revenues and expertise. Even if they may have started their channels without any funding, it's absurd to place them in the same category as the average *home cat* video.

Morcillo et al. (2015) offers a first overview of the typologies of the popular science web video, focusing on the aesthetics and trends. The results show that most of the popular channels are managed by **storytelling experts**: they show awareness and understanding of narrative and technical strategies. In particular, the study found that:

²⁵ Burgess and Green, 2009; page 41

²⁶ M. Berg, [The World's Highest Paid YouTube Stars 2015](#), Forbes. Retrieved 11/12/2016

- The design of the videos is complex. Montage and shots are often personal and experimental, and cinematography uses different techniques (such as stabilized and hand-held cameras, Steadicams and dollies);
- While most videos use narration in the first person, there are significant percentages that use third person narration and animation with voice-over narration;
- Many videos (over 33%) have complex plots, with more than 4 plot points; they also use a great variety of dramatics means, even though most of the videos focus the dramatic energy on a climax at the end, often providing the answer to a question presented during the video;
- The most popular genres are the documentary and the animation movie; there is also a significant amount of moderated live experiments. However, there is a lack of experimental formats;
- Intros usually are catchy and have an easy-to-recognize jingle; most outros focus on community building (with invitations to subscribe or links to other videos);
- Many videos use special effects, and show a good command of editing, lightning and sound design.

These points considered, we won't use the categories *user generated* and *professionally generated* here. Instead, we will talk of *institutional* and *youtuber* channels.

Institutional channels are those managed by a person or team that represents a scientific institution, and are funded (exclusively or not) by that institution.

On the other hand, it's trickier to define what a youtuber (and a youtuber channel) is. While youtubers appear as independent video makers, many – particularly in the area of entertainment – have contracts with so-called multi-channel networks (or internet television companies), that assist them in managing advertisement, digital rights and promotion, in exchange for a share in ad revenues²⁷. Often, it's impossible to tell by the youtuber profile on the website if they are involved in such contracts or not. Also, it's unclear how much these companies can influence the content of the channel. However, youtubers can still be defined as people who became famous or successful by the means of the internet, and of YouTube in particular²⁸.

²⁷ N. Davidson, [Can a Multi-Channel Network Boost Your YouTube Marketing Success?](#), SiteProNews. Retrieved on 11/12/2016

²⁸ A. Hammock, [The new fame: Internet celebrity](#), CNN Tech. Retrieved 11/12/2016

4. RESEARCH QUESTIONS

In the previous pages, we have seen that science-related channels on YouTube are successful, engaging millions of people, and thus can be a powerful tool for science institutions to reach the public, also promoting an inclusive model of communication and science research. Besides, there already is a wide audience interested in science that uses social media to search for new content and information.

Many scientific institutions are already using social media; however, we have seen that previous studies on institutional use of Facebook in particular show that social networks are still widely used for one-directional communication. Since YouTube attracts such a wide audience and the video format is considered an important tool in science communication, we think it's important to examine the use that institutions are making of it, especially compared to those who are most successful: youtubers.

There is no doubt that young freelancers like youtubers will always make a different use of a communication media than institutions, that often are bound to all kinds of protocols and restrictions. However, the studies on the aspects that affect video popularity suggest that channels don't need to produce *viral content* to increase their reach to the public, but can work on seemingly minor adjustments like creating a coherent style and increasing interactions with the audience (for example, replying to comments).

There is, however, no previous study – that we could find – examining the behavior of science institutions on YouTube; we know that they generally don't appear among the list of most popular science channels, but we don't know if their channels are inherently different than the ones created by youtubers and, if so, how they are different.

In the following sections, we will try to understand **how science institutions are using YouTube**, and why their use of it is different than popular science youtubers. In particular, we want to analyze the **coherence of their strategy** to the environment of social networks: are they exploiting the possibility to interact with the public? Or are they using the platform just as a low-budget version of a **video archive**?

In this sense, it's essential to understand if the content produced by institutions for YouTube is **platform-specific**, or if videos are just replicated on a variety of environments: the institution website, local TVs, newspapers, different social networks and so on.

Moreover, we want to understand the objectives of science institutions that have a channel on YouTube; while we generally assume that they use social media to connect with the public and spread information on their research to wider audiences, they may have other aims – or no specific one.

Our analysis will include different phases, to examine the process of video production following all its steps, from the designing of a new video to the outcomes in views and interactions on YouTube. While the data on the style, interactions and popularity of the videos can be retrieved from YouTube, from the analysis of the videos alone we could only guess their communication objectives, targets and production procedures. To have the complete picture, the examination will include interviews to the teams managing the sample channels.

The collected data and answers will help us to understand if the communication strategies used by institutional channels are successful or not, or these channels can learn something from how others are using YouTube and videos in general. In particular, we will discuss some alternative methods that scientific institutions could implement when designing science videos for YouTube.

5. METHOD

The channel analysis was divided in two phases. The first, to determine the difference in popularity between institutional and youtuber channels. The second, to examine the formats and style adopted for the videos.

After the analysis, we submitted interviews to the teams managing those channels, to compare their communication goals and production procedures with the perceived outcomes.

Channel sample

The selection of the institutional channels was based on the 2016 Academic Ranking of World Universities (category: Natural Sciences and Mathematics)²⁹. Although it's possible to use the YouTube search engine with the category "Science and Education", it's not possible to sort results based on the channel affiliation, restricting the list to institutional channels. Thus, it was impossible to base the selection only on criteria internal to the platform.

It's worth noting that this selection limits the scope of the examination only to one specific type on scientific institution; other relevant actors in the area of science communication, such as research centers and international agencies, could not be the subject of this research.

The selection of university channels was the following.

University name	Country	YouTube channel URL
University of California, Berkeley	USA	https://www.youtube.com/c/berkeleynews
Stanford University	USA	https://www.youtube.com/stanford
Princeton University	USA	https://www.youtube.com/channel/UCcBYSgQTxc126-lj_gdrO8Q

²⁹ [2016 Ranking of World Universities](#), Shangai Ranking. Retrieved 01/11/2016

Harvard University	USA	https://www.youtube.com/user/Harvard
Massachusetts Institute of Technology (MIT)	USA	https://www.youtube.com/user/MIT-NewsOffice
California Institute of Technology	USA	https://www.youtube.com/user/caltech
University of Cambridge	UK	https://www.youtube.com/user/CambridgeUniversity
The University of Tokyo	Japan	https://www.youtube.com/user/UTo-kyoPR
Swiss Federal Institute of Technology Zurich	Switzerland	https://www.youtube.com/channel/UCRNo2ggj3GiHImT_OngkouA
University of California, Los Angeles	USA	https://www.youtube.com/user/UCLA
University of Colorado at Boulder	USA	https://www.youtube.com/user/univcoloradoboulder
Columbia University	USA	https://www.youtube.com/user/columbiauniversity
University of Oxford	UK	https://www.youtube.com/user/oxford
Pierre and Marie Curie University - Paris 6	France	https://www.youtube.com/user/UPM-CUNIVERSITE/featured
University of California, Santa Barbara	USA	https://www.youtube.com/user/UCSB-News
Northwestern University	USA	https://www.youtube.com/user/NorthwesternU
Cornell University	USA	https://www.youtube.com/user/CornellUniversity
University of Chicago	USA	https://www.youtube.com/user/UChicago
University of Michigan-Ann Arbor	USA	https://www.youtube.com/user/um
Yale University	USA	https://www.youtube.com/user/YaleUniversity
Kyoto University	Japan	https://www.youtube.com/channel/UC3ikR0k6iSoz7DcdRsXS2xA
Peking University	PRC	-

Of this list, the University of Michigan Ann-Arbor, Yale University and Peking University were left out of the analysis; the first two, because there were no science-related videos on the channel (all their uploaded videos had informative content on the universities in general), the latter, because it did not have a YouTube channel (although it's active on Chinese social media).

Since the goal of the examination was to compare institutional YouTube channels with the best possible examples of science communication on the website, the youtuber channels were selected based on popularity. Moreover, since these channels serve to the study only as a reference group, a smaller sample was selected.

We conducted a research using the category “Science” on the YouTube search engine, after disabling cookies and cleaning cache memory data (since these factors can influence results, based on personality settings), and sorted the results based on number of subscribers. From the resulting list, we selected only the channels with a strong focus on scientific content. For examples, channels like *Vsauce* (11 million subscribers) and *CrashCourse* (5 million), that have a considerable amount of videos on pop culture, history and economics, were left out.

The sample of non-institutional channel was the following.

Channel name	Number of subscribers ³⁰	YouTube channel URL
AsapSCIENCE	5 871 086	https://www.youtube.com/Asap-SCIENCE
Smarter Every Day	4 307 429	https://www.youtube.com/destinws2
SciShow	3 860 762	https://www.youtube.com/scishow
Veritasium	3 772 718	https://www.youtube.com/1veritasium
MinutePhysics	3 601 041	https://www.youtube.com/minutephysics
Kurzgesagt - In a nutshell	3 197 863	https://www.youtube.com/Kurzgesagt

None of the channels in these sample has an affiliation with a multi-channel network – the media production companies we mentioned in the Literature review section – and they can all therefore be considered independent productions.

³⁰ Retrieved on 11/11/2016

6. POPULARITY: ANALYSIS AND RESULTS

Data collection

As a preliminary analysis, we compared the popularity magnitude of institutional and youtuber channels. For every channel, we collected the number of subscriptions³¹; then, we selected the most popular video with science-related content and collected the data on views and user interactions (likes, dislikes, comments). The number of shares on other social networks was not available for the majority of the channels, therefore it was not included in the data collection.

Three institutional channels had disabled the comment feature on their videos; namely: Princeton, Harvard and the University of Tokyo. While the option to disable comments is often used on YouTube on videos that are highly controversial and likely to draw abuse or bullying on the video-maker, none of the channels seems to deal with such type of content.

The charts in the following pages show a clear disproportion between the popularity of channels from the two categories, especially in terms of subscriptions [A].

Notably, a small number of videos from MIT had an amount of views comparable to youtuber channels [B]; those included, in particular, some videos on a robot cheetah prototype³² that has been widely covered by news services (and thus embedded on high-traffic websites like Wired³³ and CNN News³⁴). Also, the Cornell University channel had one incongruously popular video, titled “Birds-of-Paradise Project”³⁵, produced in partnership with the National Geographic. However, all the other videos, science-related or not, were considerably less popular; the second best reached 380 thousand views.

³¹ Retrieved on 02/11/2016

³² MIT, [MIT cheetah robot lands the running jump](#), YouTube

³³ N. Patel, [Watch this terrifying cheetah robot jump over hurdles](#), Wired

³⁴ L. Said-Moorhouse, [Look out! Autonomous, military-funded, cheetah robot is off its leash](#), CNN Tech

³⁵ Cornell University, [Birds of Paradise Project](#), YouTube

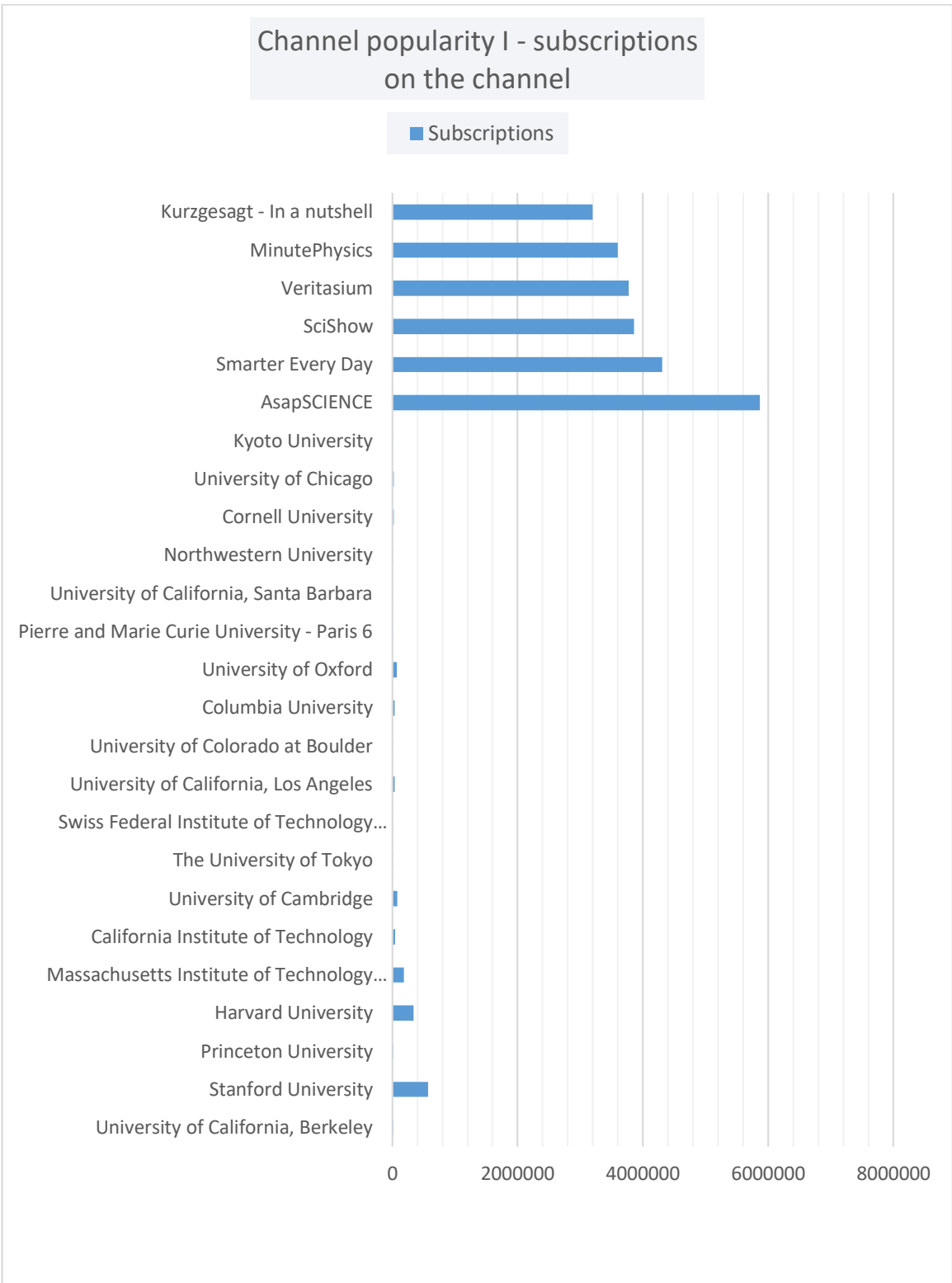


Chart A

Channel popularity II - views and interactions on the most popular video

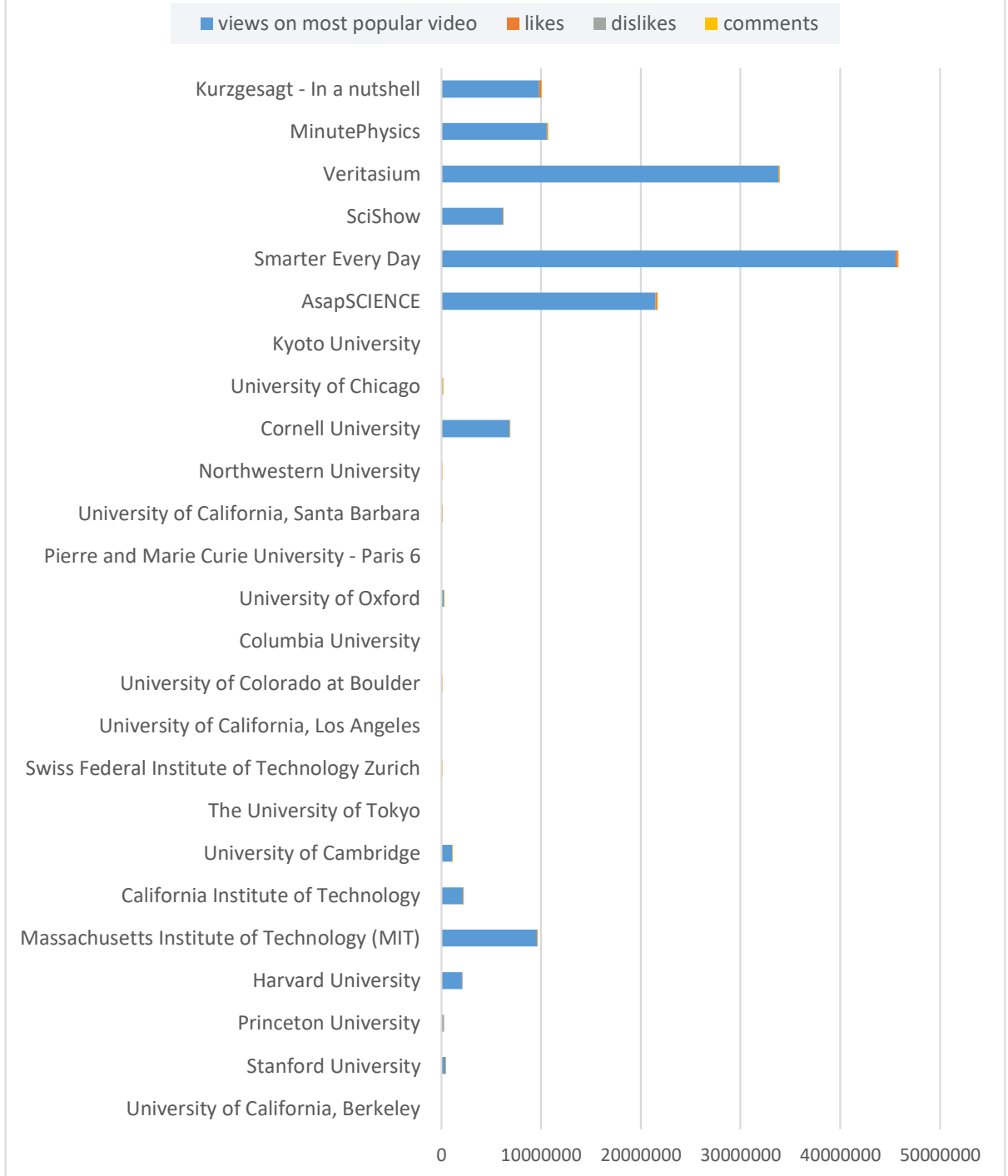


Chart B

7. CHANNELS STYLE: ANALYSIS AND RESULTS

After collecting data on the popularity, we examined the style and video formats used in the different channels. The aim of this analysis was to identify which channels had a distinct and recognizable style and, in this case, if it was appropriate for the platform. As discussed above, Welbourne and Grant (2015) present some parameters that seem to be linked to popularity of science videos on YouTube.

We considered the following parameters:

- **continuity of the communicator:** throughout the different videos uploaded on the channel, it's possible and easy to recognize one person (or more) that reprise the role of the communicator; in the case of voice-over animation, the voice is recognizable;
- **speech rate:** the pace of delivery, counted as words per minute;
- **video format;** even if this parameter cannot be directly correlated with an increase in popularity, channels that show consistency in style are easier to recognize; therefore, we analyzed how many different formats were used in every channel and which ones.

During the examination, these six format categories were identified³⁶:

- **vlog:** a video style typical of YouTube and other internet platforms, where the presenter delivers content by talking directly to the camera (positioned as it was – and frequently is – the integrated webcam of a laptop computer);
- **interview:** the person delivering content is not the video creator (that is off camera or in a secondary role), but an expert instead;
- **presentation:** the presenter delivers the information to an audience and not the camera specifically (this style is typical, for example, of TED Talks);
- **voice over visuals:** videos where someone talks over footage or visuals (animated or static);
- **text over visuals:** similar to the voice over visuals, but narration comes in the form of text over the video and there is no voice³⁷;

³⁶ These categories were the same found by Welbourne and Grant (2015).

³⁷ For the videos in this category, the speech rate was considered equal to 0.

- **hosted:** the communicator presents the information, in a way that can be stylistically similar to a vlog; however, other people (such as members of the public or interviewees) are also in the video, often in a secondary position.



Vlog video



Interview video



Presentation video



Voice over visuals video (with captions)



Text over visuals video



Hosted video

Data collection

For this analysis, we randomly selected a sample of videos from every channel; some categories of videos were considered not related to our research and left out. These were:

- news videos not related to research but to university life and events in general;
- informational videos for prospective students;
- unedited live recorded lectures or celebratory speeches;
- instructional videos (such as tutorials);
- videos containing intriguing information not related to a scientific topic³⁸;
- personal vlogs.

As a result, we analyzed 93 institutional videos and 19 non-institutional videos. Videos by youtubers were more consistent in format, and it was easier to identify the general style of the channel, even just from the thumbnails in the upload list. Most institutional channels displayed a variety of different video formats, no communicator continuity and, in general, no recognizable traits.

Communicator continuity

As displayed in the charts below, most of the university channels didn't have a recognizable communicator, while all of the youtuber channels did. This result is a crucial point, since social networks like YouTube are based on human interactions and on the relationship of trust that content creators are able to build with their followers. In their YouTube videos, most universities decide not to show a recognizable communicator, reinforcing the stereotype of the institution without a face.

³⁸ Topics related to science were selected considering the OECD classification of Fields in Science and Technology <http://www.oecd.org/science/inno/38235147.pdf>

Moreover, most of the videos focusing on research news suffer from a lack of curation: often, while the videos are well shot and produced, there is no attention to the context (such as past research of the same teams, collaborations between departments, future projects) and it's therefore difficult for the viewer to get an idea of what are the characteristics and strengths of a particular institution. The feeling is that, even watching five or ten videos from the same channel, it's generally very difficult to distinguish between videos from different universities.

The only institutional channel with a recognizable communicator was the MIT channel, that displays a series of animated research news videos narrated by the same female voice.

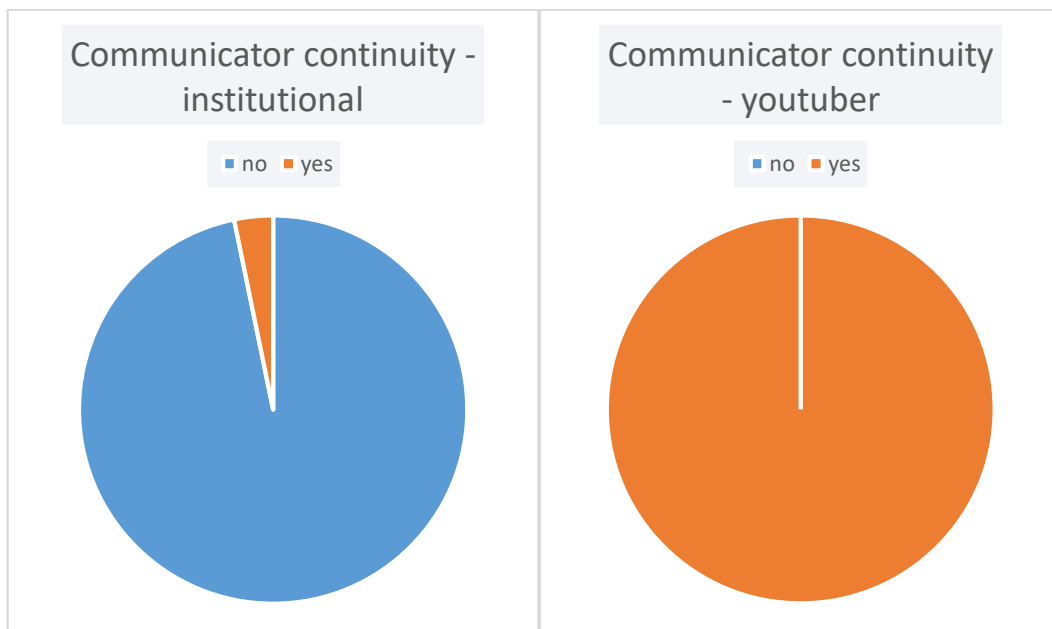


Chart C

Chart D

Speech rate

The pace of delivery was calculated in words per minute, based on the automatic transcription feature of YouTube. In the cases where this feature was not available, words number was recorded manually. Many videos featured music intros or outros, or animations with no voice over; for these videos, we considered only the effective speaking time.

The results show a significant difference between the two categories; while most of the institutional videos oscillate between the speech rates of 100 and 150 words per minute [E], most of youtuber videos are over 150; some even go over 200 words per minute [F].

While it's generally considered best for public speakers to keep an average of 100 to 150 words per minute to improve comprehension³⁹, faster rates are believed to improve persuasiveness and audience focus⁴⁰. In this case, comprehension and attention are considered two competing outcomes. However, while for public speakers it's best to keep a slower pace since their speech can't be repeated, on YouTube videos can be replayed at any time, so comprehension is less at stake; therefore, higher rates of content delivery can be adopted to increase engagement and interest.

³⁹ R. D. Sudha, 2010

⁴⁰ H. E. Chambers, 2001

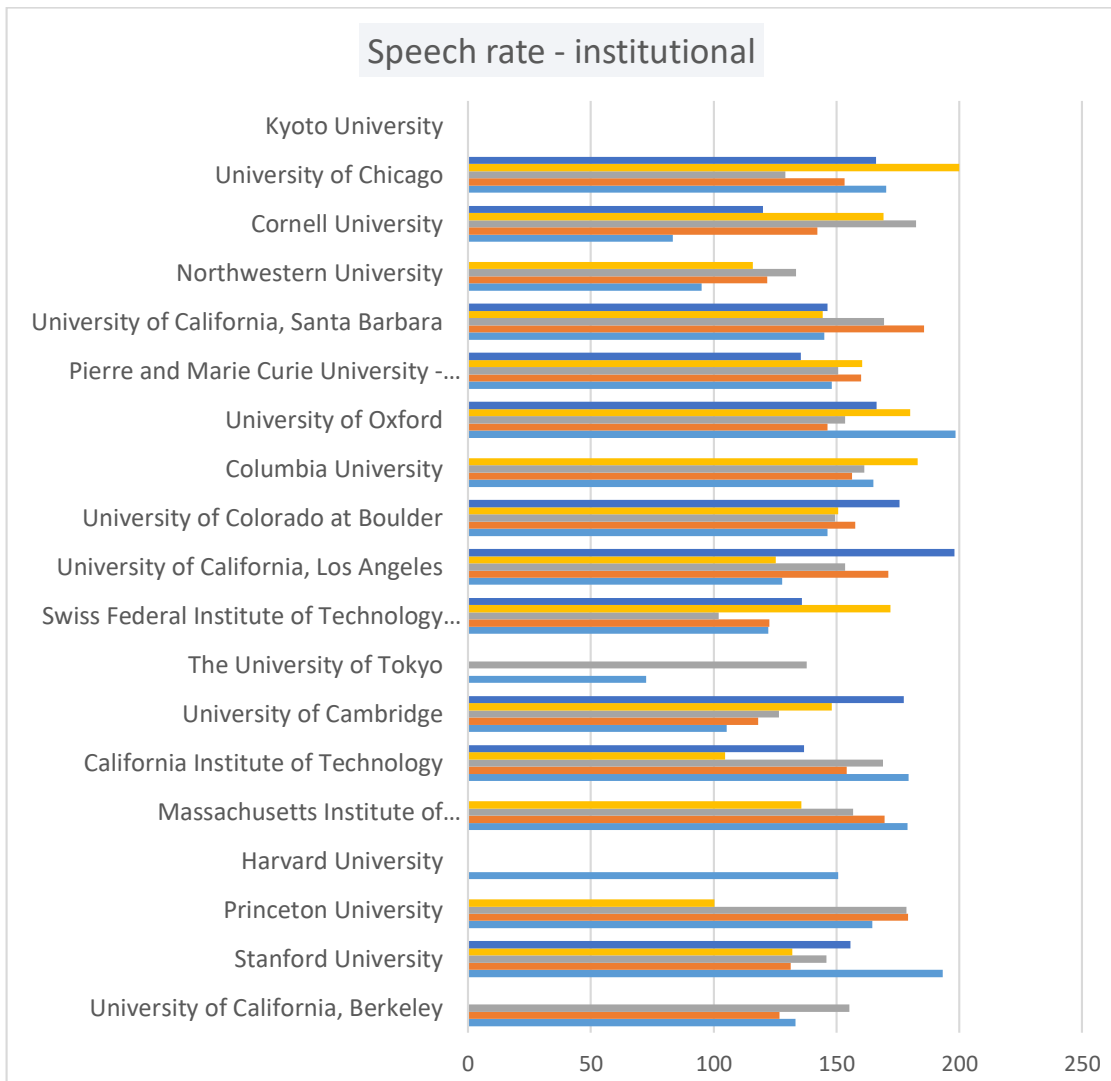


Chart E

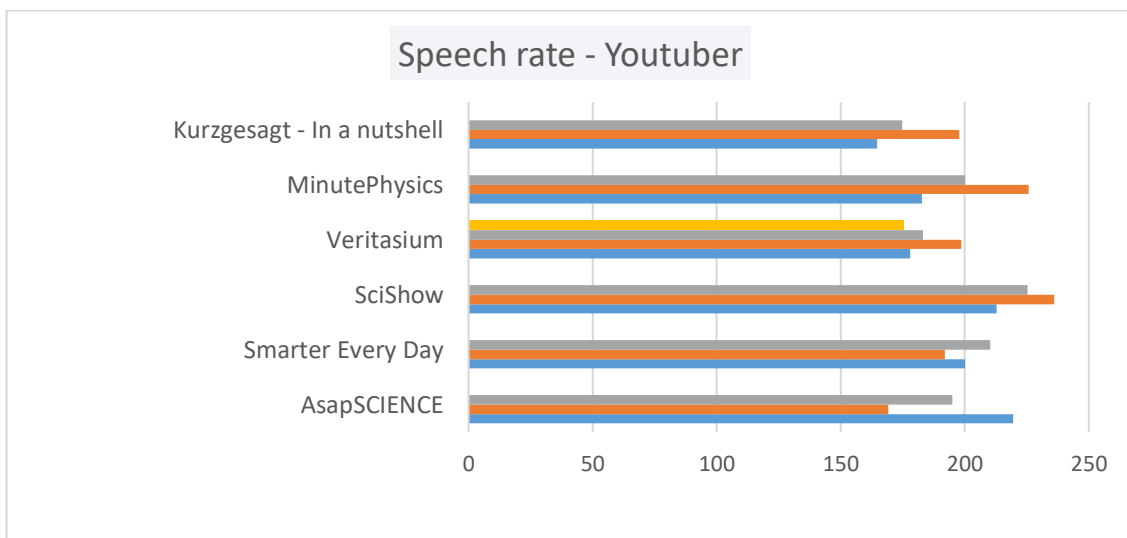


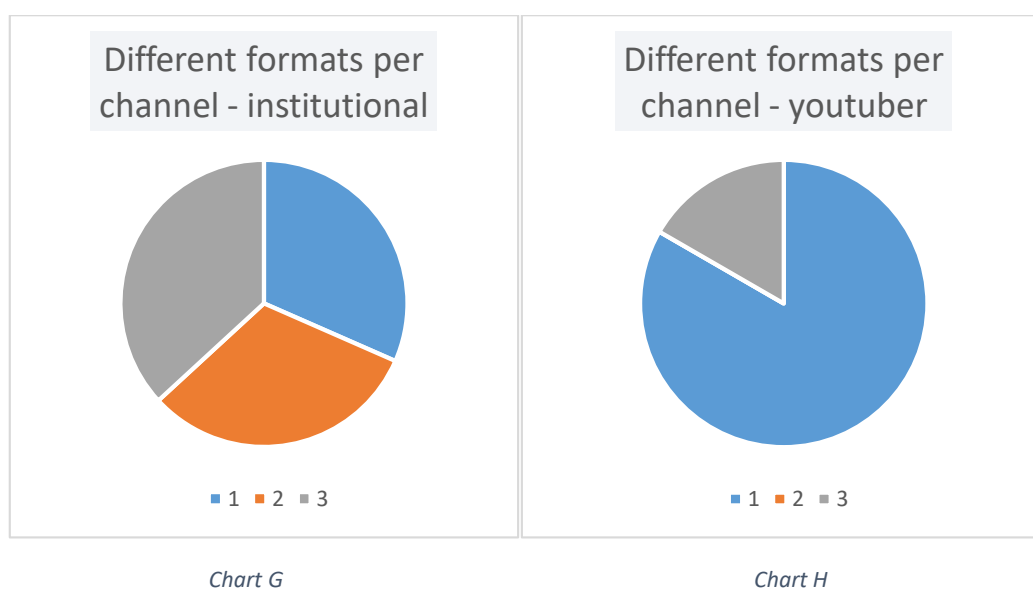
Chart F

Consistency in style and formats used

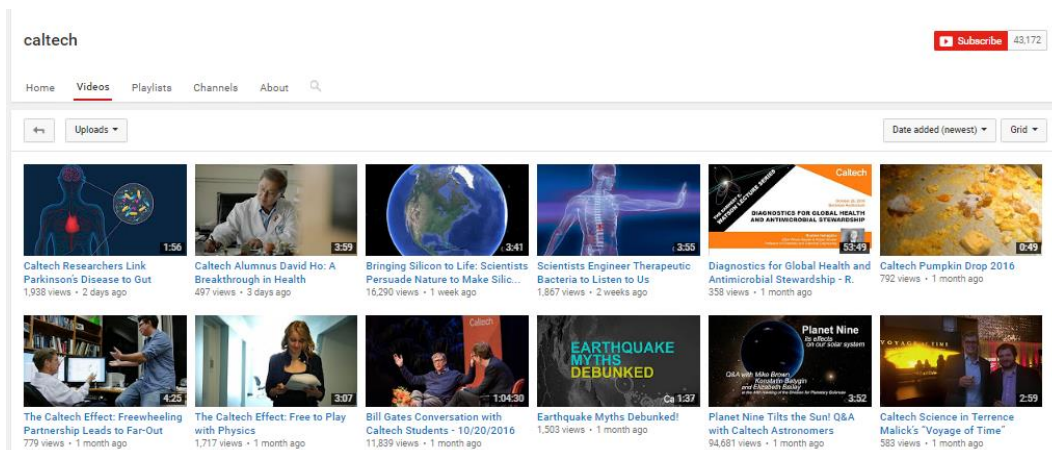
Most of the institutional channels show little consistency in format used; even considering only research news and science-related videos, universities show internal variety of styles, that often make it difficult to immediately identify a video as part of a specific channel. Moreover, not many channels use animated intros or logos that would make it easier to identify the university.

Even if two thirds of university channels use two or more formats⁴¹, a third shows consistency, using only one video style and sometimes presenting the series of science news video on an isolated playlist [G]. Interestingly, most of the institutional channels that displayed continuity chose the format of the **interview** (Stanford, ETH, University of Colorado, Oxford, University of California Santa Barbara).

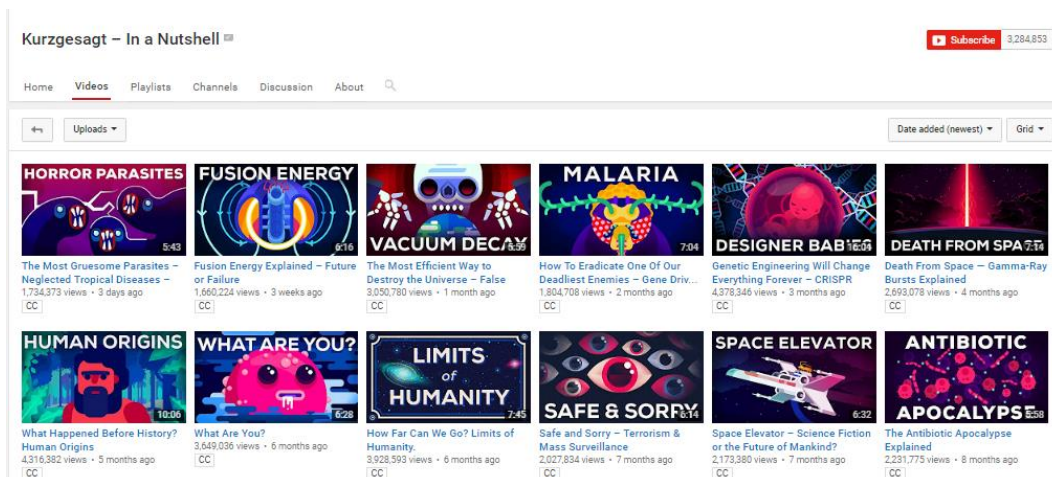
On the other hand, the majority of youtuber channel uses only one type of video; usually the chosen format follows a precise standard [H]. For example, the channel *Kurzgesagt – In a Nutshell* features only voice over animation videos, with a very distinctive flat and colorful design; the narrator voice remains constant throughout all the videos on the channel. The only youtuber channel that uses a variety of different video styles is *Veritasium*.



⁴¹ Since in this analysis we considered an average of five videos per channel, up to three different video styles were registered. However, it's probable that every channel used also other formats.



The list of videos from Caltech features voice-over animations, interviews, presentations and text-over animations.



Just from the list of thumbnails, it's clear that all videos from channel Kurzgesagt are using the same style.

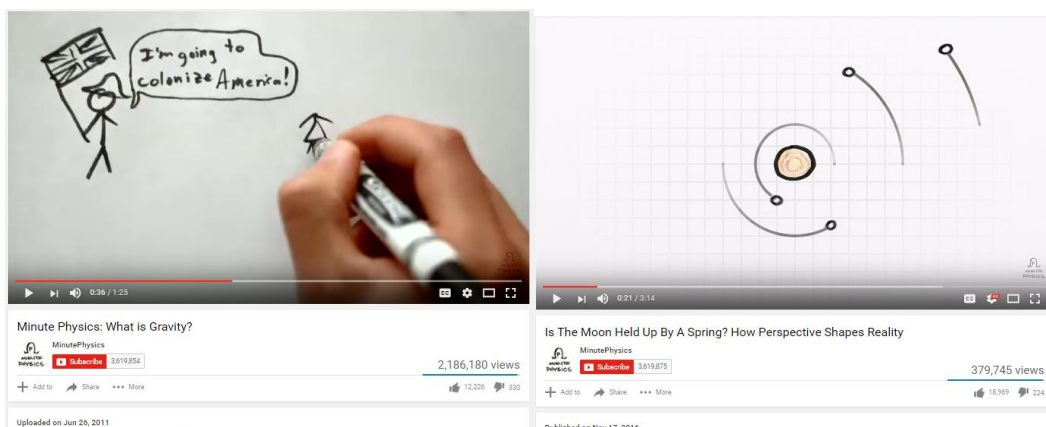
Formats

The two categories of channels mainly used very different video styles. The analyzed institutional videos were mostly **interviews** (57%): since most of the clips are related to research news from different university department, it makes sense that the most of the content features **direct explanations** from the scientists conducting the researches [I]. Some of the interviews also included laboratory footage or 3D-modeled animation produced for the studies. While the majority of these interviews is edited, they are still characterized by a slow pace and rare use of dramatic elements (like climax and anticipation).

Other prominently used styles are **voice over visuals** and **text over visuals**. The former is also used to show research findings, but in a more cohesive and dramatic manner than interview videos; however, while this format is widely adopted, the style of visuals is rarely consistent throughout the videos on one channel. For example, voice-over videos from the MIT channel feature the use of hand-drawn animation, laboratory footage and studio footage. Text over visuals videos are also significantly used by university channels (the third most common style, counting 18% of the analyzed videos); however, most of them show a lack of editing and care, with little music and **vague and scarce explanatory text**. Some of the analyzed footage came directly, with seemingly no or little modifications, from laboratory videos and computer-generated graphics.

On the other hand, youtuber channels showed to mostly prefer **voice over visuals videos** (58% of the clips examined), vlogs and hosted videos [J]. From the content analyzed, it appears that narrated animations may be so widely used for different reasons:

- they can be produced rather inexpensively, particularly if the animation style remains consistent over time. For example, old and new videos from MinutePhysics show basically the same structure, with hand drawn animation (usually with a black marker over paper). While the lighting and voice recording appear to have improved a lot over time, now including also some computer animation, this format undoubtedly favors video makers that cannot afford a big investment to start their channel.



Two videos from the channel MinutePhysics. Since the first video uploaded in the channel in 2011 (on the left), the lighting and animation on the videos has improved in quality, though preserving the same general style.

- Voice-over videos are based on a carefully prepared script, allowing even the inexperienced to have control over the general outcome of the video, while interviews are more difficult to control. For example, the audio can be rerecorded or edited in post-production, the dramatic structure of the script can be changed and it's relatively easy to shoot additional footage if needed.
- Using animation, it's easier to create a recognizable style (for example, using hand drawing) than with other techniques, like montage and photography.

Other popular styles are vlogs and hosted videos. Interestingly, while presentations are uncommon as in institutional videos, the format of the interview and the text over visuals video are never used in the sample examined.

The absence of interviews marries well the tendency of youtubers to be the constant voice presenting the content, while never introducing themselves as experts. Besides, the scientific sources of the information presented in the videos are often referenced in the description of the video itself, making them directly accessible to the users in the audience that wish to learn more.

On the other hand, while the text over visuals format may appear similar to the voice over visuals, it's worth noting that the presence of narration increases the viewers' attention and engagement; however, the former style is successfully used by media channels of YouTube like BuzzFeed⁴² and Vox⁴³, so it's unknown why it's not used in science channels.

⁴² BuzzFeed Blue, [What does Bug Spray do to everyday objects?](#), YouTube

⁴³ Vox, [Turkeys have gotten ridiculously large since the 1940s](#), YouTube

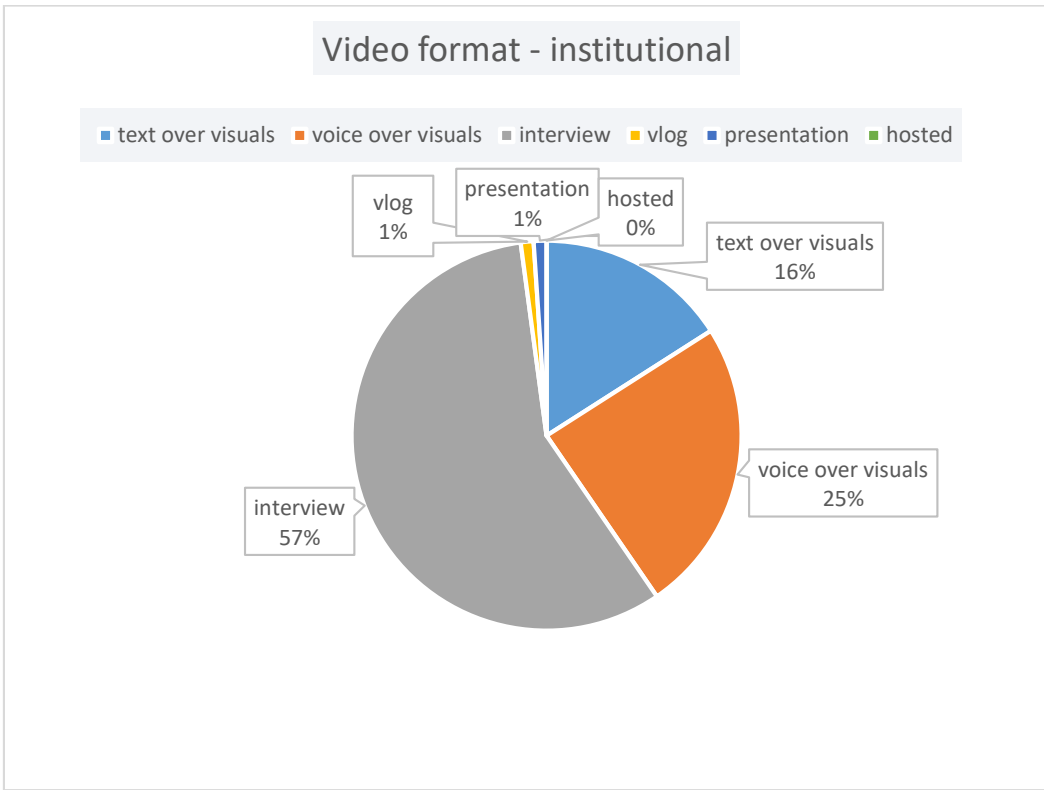


Chart I

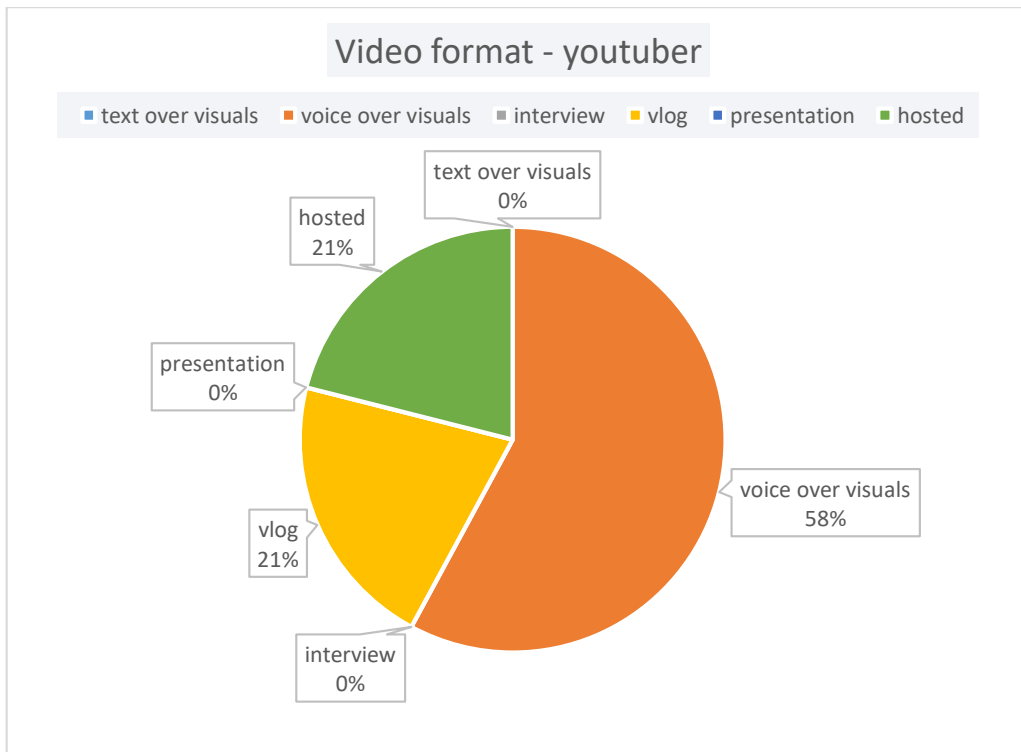


Chart J

8. INTERVIEWS

In the previous pages, we have seen that institutional channels are, in general, less popular and less precisely characterized than youtuber channels. However, examining only the outcomes of the channels and the finished videos, we can't have any direct information on the objectives and priorities of these channels. To put our results in perspective, we submitted a series of questions to the teams managing all the channels in our sample, both universities and youtubers.

The questions were formulated with the aim to investigate five general aspects of video production:

- **Communication means;** the objectives of the channel, for example: providing educational content, reaching perspective students, being recognized as an institution of excellence.
- **Awareness of the specificity of YouTube as a platform;** if the content produced is platform-specific and therefore created considering the differences between YouTube and a proprietary video service (such as a page on a university website).
- **Knowledge and use of social network-like features;** such as the perception of likes and dislikes and the moderation of comments.
- **Attitude towards the YouTube environment;** knowledge of other science-related (and generally notable) channels and perception of them as competitors or possible allies.
- **Investment;** time and human resources invested in the channel.

Starting from these key points, we created a list of fourteen question that were submitted using a Google form.

1. What procedure do you follow when producing a new video for the channel you manage? If you were to summarize it in 5 steps, what would these steps be?

2. How many people work on the production of a video for your channel, usually? And how many people do you think should work on one?
3. How long does the production of one video take, usually?
4. On how many online platforms are your videos published (without any change)? Which ones?
5. If you publish the videos after some changes: what adjustments do you make?
6. Do you have an ideal user in mind when you start designing a new video?
7. Have you ever experienced an unexpected number of dislikes on one of your videos? If so: what do you think the reason was?
8. If don't: how would you have reacted?
9. How would you react to an offensive comment on one of your videos?
10. What would you do if a commenter doubted the scientific validity of the content?
11. What would you do if a user added anti-scientific comments to one of your videos?
12. Is there a YouTube channel you particularly admire?
13. If you received a collaboration proposal from another YouTube channel (like a university or a youtuber), to produce a video together, would you accept? Which limits would you set?
14. Describe the YouTube channel you manage using 4 words.

Unfortunately, not many channels granted us availability to answer these questions; however, the few responses we got back were still significant.

Answers highlights

We got back six sets of responses, five from university channels (MIT, UC Berkeley, Harvard, ETH Zurich, and the University of Tokyo) and one from youtubers (*Kurzgesagt*). The remaining channels were mostly unresponsive, or explicitly declined our request⁴⁴. One additional youtuber (Henry Reich from *MinutePhysics*) could not take the time to complete the interview, but sent us a work-in-progress list of FAQs he had been preparing for his personal website, that provided answers to some of our questions.

Let's have a look at some of the most meaningful responses, divided by category.

- **Communication means**

Most of the responses from the universities showed that their intent is to **spread informative content** on science research **to the general public**. However, two universities also described their channels as *thought-provoking, entertaining, and fun*.

The University of Tokyo channel mentioned its role as a content aggregator for the university's different faculties:

"[...] One of the roles of the main YouTube channel is to aggregate videos published throughout the University, and the making of these videos is often handled by Faculties/Graduate Schools, etc."

In this context, the published content won't probably follow a common communication goal or even be targeted to the same audience. Moreover, aside from research news the university channels also contain information about the courses and promotional material for perspective students.

While we don't have their answers, we can have some information on the communication goals of youtubers from their personal profiles: many – such as *MinutePhysics*, *AsapSCIENCE* and *SciShow* – mention their love for science, the intention to be entertaining and fun, and to promote **curiosity**.

⁴⁴ Destin Sandlin, of the channel *SmarterEveryDay* declined for personal reasons.

When asked to describe their channel in four words, *Kurzgesagt* replied:

“Explaining complicated stuff nicely.”

- **Awareness of the specificity of YouTube as a platform**

All of the university channels mentioned **re-posting their content on multiple platforms**, mostly on other social networks (Facebook, Twitter, Instagram and Google+) but also on their websites; Berkley provided the most abundant list of different platforms where they upload content without making any changes, explaining:

“We send most of our videos to the news media, accompanied by written stories. Sometimes the news media will post our video on their site, or use our footage to create their own videos. We also post our videos on numerous websites of UC Berkeley (homepage, news page, relevant department pages.) The videos also are posted on Berkeley’s YouTube, Facebook and Twitter pages.”

However, some responses showed that, even though content is replicated on other websites, it’s modified to fit to specific needs. The University of Harvard wrote:

“If we also upload to Facebook, we’ll either add captions or text overlay so viewers don’t need audio. We’ll often shorten the videos too, and remove the header/footer since we need to grab attention quickly.”

Youtubers, however, mentioned uploading content **exclusively on YouTube**. Notably, channels like *AsapSCIENCE* and *SmarterEveryDay*, that have profiles on other social media, generally embed or link their videos, instead of re-uploading them. This behavior is probably related to the fact that their videos are subject to monetization, and views on other platforms could have a bad impact on their ad revenues.

- **Knowledge and use of social network-like features**

Coincidentally, two of the university channels that provided answers to our interview have **blocked comments** on their videos; this fact gave us the opportunity to understand why they decided to block one possibility of interaction with their audience.

Harvard University seems to be bothered by the amount of **moderation** that comments would require, writing candidly:

“For Harvard, [offensive comments would be] unfortunately typical because people use the popularity of our videos as a platform to express their opinions — even if offensive. This is why we disable comments from all our videos, so we don't have to react at all.”

Moreover, when asked about how they would react to anti-scientific comments, they respond:

“We wouldn't do anything, because thankfully, our comments are private, and it would be too cumbersome to hide each of these offensive remarks. [...] We release so much content that we don't have time to regard people individually.”

The University of Tokyo channel doesn't explicitly explain why comments are disabled, but it's considering the possibility of enabling them in the future. Unlike Harvard, their general attitude would be to keep eventual offensive comments untouched, since they represent **personal opinions**:

“We currently have commenting disabled so we have not had to react, but we are considering enabling comments sometime in the future. If we do enable comments, we will, of course, delete comments that contain spam or personally identifiable information. However, if a comment is simply

expressing a negative opinion, we will leave it on the video.”

On the matter of dislikes, the University of Tokyo added:

“While they are few in number, we have received *some dislikes* on our videos. We believe that these dislikes just express the thoughts of some of the individuals that are watching the videos. Also, we consider these dislikes to be valued opinions of our videos’ viewers, so we want to use them as indicators to gauge opinions on our videos.”

However, enabling comments would probably be a much better way to let viewers express their *valued* opinions.

Youtubers, on the other hand, seem to have no problem moderating the huge amount of comments on their videos. For example, Kurzgesagt replied that their reactions to an offensive comment would go “from ignoring to banning [...], depends on how offensive it is”, while anti-scientific comments would result in an instant ban.

From the list of MinutePhysics FAQs, we quote the standard answer to people pointing out mistakes in the channel’s videos:

“I have mistakes in lots of my videos [...]; most of the time the things I actually get wrong are very different from the things people think I get wrong – there’s a lot more subtlety to physics beyond what you learn in high school/first year university and part of my goal making these videos is to expose everyone to more of that physics! [...] But, if you still think there’s a mistake in a new video, please let me know – I’m always eager to learn.”

- **Attitude towards the YouTube environment**

Interestingly, when asked which other YouTube channels they appreciate and would recommend, the two categories of video makers named channels belonging to their same category.

For example, *Kurzgesagt* recommends *CGPGrey*⁴⁵ and *CrashCourse*⁴⁶, and *MinutePhysics* references to videos by *Veritasium*; on the other hand, university channels appreciate videos from traditional media outlets like the BBC and the Late Night Show with Jimmy Fallon.

On the matter of **collaborations**, both universities and youtubers show a **cautious attitude** for different reasons. While universities are generally bound by their policies, the sample of youtubers seems to be preoccupied by possible wastes of time, since they receive a huge amount of proposals.

For example, Catherine Seraphin, the manager of the Harvard YouTube channel, wrote back on the matter:

“That decision would be out of my hands, unfortunately, and dependent on the higher-ups here at Harvard.”

The other universities also mentioned their need to have final approval of the video and that the decision would be **influenced by university politics** and the content of the proposal.

Youtubers, on the other hand, have already a precise idea of who they would like to collaborate with. Henry Reich of *MinutePhysics* wrote:

“When I was first starting on YouTube, I would do collaborations with other creators of similar size and focus in order to cross-promote our channels and meet new people [...]. However, at this point I mainly do collaborations with friends/colleagues/other people I already know – there

⁴⁵ [CGPGrey profile](#), YouTube

⁴⁶ While [CrashCourse](#) is now part of PBS Digital Studios (from January 2015), the channel launched as an independent production in 2011 by Hank and John Green (also known as the Green Brothers).

are a ton of them who I'm excited to work with and never have.”

Kurzgesagt mentioned the size of the perspective collaborator channel as one of the key motives too; when asked if they would accept collaborations proposals from other channels, they replied:

“Most likely no. The truth is it seldomly is worth the time. The other channel needs to be about our size for it to make sense. An institution can sponsor us and collaborate with us this way but we don't do it for free.”

None of the answers we received showed any sign that other YouTube channels are considered as competitors.

- **Investment**

From the information we could find on their personal pages, we know that most of the youtuber channels in our sample are managed by **one to three people**, doing everything from writing the scripts to shooting and adding VFX (video effects) on the videos. In particular, *AsapSCIENCE* is run by two people (Mitchell Moffit and Gregory Brown), *SmarterEveryDay* by Destin Sandlin alone, *SciShow* by three people (Hank Green, Michael Aranda, Olivia Gordon), *Veritasium* by the one Derek Muller and *MinutePhysics*, as mentioned, by Henry Reich. *Kurzgesagt*, on the contrary, is run by a team of eight people, since the graphics and animation used are much more complex than the ones used in the other channels. Most of the channels upload videos on a **regular basis** (this is not enough to assume that the process of video production follows the same regular calendar, though).

However, it's more difficult to estimate how many people are working on university channels, since this information is not available on their websites. From the responses that we got, at least we can estimate that the composition of these teams may **vary significantly**, based on the process of video production and the organization of the university (for example, big universities may have dedicated communication teams for multiple faculties). The universities interviewed reported having between one and ten people working on a video; for example, the University of Tokyo reported:

“[...] the number of people working on our videos varies. For example, for a university introduction video, more than 10 individuals may be involved working in cooperation with professional staff, while for a video showcasing research, there may be only 1-2 people involved.”

Moreover, the time needed for the production of videos seem to follow the same trend, varying greatly; few responses suggest that in some cases the production schedule may be constant and well-organized, as for Berkeley:

“The combined total hours of work to produce one fully-packaged video, including multiple interviews, bRoll, graphics, music, is 3-5 days, or longer if we're building more involved graphic animations.”

However, other answers suggest **less organized schedules**, even with what sounds like a hint of frustration from MIT:

“[...] it's really hard to explain how long it takes. I'm constantly toggling between projects due to deadlines and other factors.”

Some mentioned also the possibility to embark in extremely long projects, taking several months; for example, ETH wrote:

“[production] can be between 1 week to 1 year. For news it's one week from the idea to the edit, but not fully filled with production of course.”

9. CONCLUSIONS

In the previous pages, we wanted to find an answer to these questions:

- What are the differences between institutional and youtuber science channels?
- Is the strategy used by institutional channels appropriate for social media?
- Are the objectives of science institutions coherent with their actual behavior on YouTube?
- What can science institutions learn from youtubers?

From the data collected during the analysis and the interviews, we can conclude that there are some differences in the production and in the style of the two categories. While youtubers are more independent and free to decide their objectives and schedule, university channels have to stick to institutional policies and some of the objectives may not be under their control. Moreover, the **context** in which they operate is often **complex**: for example, the team managing social media and YouTube may be different from the one that produces videos, or from the one deciding the coverage of research news. However, university communicators benefit from **stable financing and resources**, which enable them to embark in long-term projects and strategies.

On the other hand, the main difference in the styles of the two categories is characterization – or, to use a marketing term, *branding*. All successful YouTube channels have accurately defined styles, that are not necessarily original or peculiar, but are easy to recognize. This continuity is the feature most lacking from institutional channels; also, the **absence of recognizable communicators** or scientists acting as familiar faces for the viewers does not allow universities to improve their online image. Instead, it's a **missed opportunity** to establish a trust relationship with the audience using a social network.

The fact that universities don't generally produce platform-specific content, reposting it instead on multiple different websites, suggests that they may not be aware of – or don't consider of primary importance – the specificity of social media. This conclusion is also backed by the general **disregard for**

interaction with the audience; for example, in our analysis we found no occurrence of university profiles responding to comments on the videos, even in the case of direct questions. However, the scope of this analysis was too narrow to conclude that science institutions disregard interaction on social media in general; it would be interesting, though, to further examine the behavior of institutions on other widely used platforms such as Facebook and Twitter.

On the matter of the coherence between the objectives of science institutions and their factual strategies, it's more difficult to draw conclusions, since we don't have direct data from most of the universities in our sample. From the information we could find on their websites, we think it's plausible that most of the examined channels have the same objective of providing **informative content** on the research produced by the different departments in the university; and, on most of the channels, this is delivered, since the videos are informative and well-produced. On the other hand, the majority of channel we analyzed were too dull to be considered entertaining and fun, as some universities mentioned it was their aim.

Sadly, we could not find any clue that institutions are trying to reclaim their role in the public debate about science on social media, or that are using YouTube as a way to talk to their communities – two points that we considered crucial in Chapter 2. From their YouTube channels, we got a feeling of **anonymity** and **detachment**, as if the science news presented were in some way unrelated to the real world and the university context.

However, we found no reason to believe that universities and science institutions in general cannot change their appearance on social media: we think that youtubers can be taken as an example to make many small improvements on institutional communication. The financial stability (compared to youtubers, at least) of institutional communication teams is an ideal starting point for **long-term strategies**; for example, to create a stable format for a channel, or to produce series of videos with a recurring theme. Moreover, a science institution has unique **access to scientists** in their working environment, and thus the possibility to follow them through different researches, providing the audience with context and painting a wider picture of science.

In the next chapter, we are going to present an example of YouTube channel that mixes the youtuber approach with the context of a science institution.

10. A HYBRID CHANNEL: PERIODIC VIDEOS

As we wrote at the beginning of this thesis, the rules of YouTube are not set in stone. While we have examined the differences between institutional and non-institutional channels, there are a few examples of projects that defy this distinction. The most famous one is probably **The Periodic Table of Videos**, a successful experiment created from the collaboration of an independent video-journalist, Brady Haran, and the University of Nottingham.

The experiment began in 2007, when Brady Haran – an Australian journalist working with the BBC – started working as a filmmaker-in-residence as part of Nottingham Science City, an initiative partnered by the University of Nottingham. His plan was to produce a feature-length documentary film about “what real scientists are like and how they work”⁴⁷; the project evolved in *Test Tube*, a series of clips of raw footage uploaded on YouTube, in the form of the *behind the scenes* video. The format proved to be successful, gaining an International Business Award in 2008 and a modest following⁴⁸.

During the filming for *Test Tube*, Haran worked with the scientists in the university’s Chemistry department, establishing a strong collaboration with Research Professor Martyn Poliakoff. To Poliakoff, Haran pitched the idea for a **series of 118 videos** on all the known elements of the Periodic Table, featuring **experiments** and **demonstrations**.



Brady Haran – courtesy of www.bradyharanblog.com

⁴⁷ [About Test Tube](#), Test Tube. Retrieved 11/12/2016

⁴⁸ [Nottingham Science stories win international award](#), Nottingham University

The project was approved and overseen by the University of Nottingham; the first 118 videos were shot – unscripted⁴⁹ – between June and July 2008 and uploaded on YouTube, on the channel *Periodic Videos*. Additionally, Haran created a website for the project, with a page dedicated for every element and links leading to the videos⁵⁰. The clips featured nine scientists from the University of Nottingham, but the most recurrent and visible was Professor Poliakoff: with his Einstein-like hair and enthusiastic explanations, he quickly became sort of an **internet sensation**.



Professor Martyn Poliakoff in a shot by Haran, wearing a Periodic Table tie.

The channel acquired thousands of followers on YouTube in a few months, making in one of the most popular chemistry-related channels on the platform. After the first series of videos, the channels started adding new content, as Poliakoff and Haran write⁵¹:

“An obvious route was to update some of the more hastily produced videos with more experiments, new information; [...] an additional opportunity was identified: **linking chemistry to topical events**. Themed videos were produced about the 2008 Olympic Games (gold, silver, and bronze); the announcement of Nobel Prizes; and, more lightheartedly, the chemistry of pumpkins for Halloween.

⁴⁹ B. Haran, M. Poliakoff, [The Periodic Table of Video](#), *Essays on Science and Society*, Science, 27/05/2011

⁵⁰ [Periodic Videos Website](#)

⁵¹ B. Haran, M. Poliakoff, 2011

Soon PTOV had almost become a **chemical news channel**, covering events such as giving the name copernicium to element 112 or the Science paper in which helium was disguised as H^{4.1}.”

As of 2012, Haran had left the BBC to work full-time on YouTube videos, contributing to a dozen different channels and continuing to collaborate with the University of Nottingham to create *Sitxy Symbols* (on physics), and with the Mathematical Sciences Research Institute to create *Numberphile* (on mathematics) and *Computerphile* (on computer science).

As of today, *Periodic Videos* has over 870 thousand subscribers and almost 150 million total views; the other projects are as popular: *Sitxy Symbols* has 600 thousand followers and 60 million views, *Computerphile* has 700 thousand subscribers and 47 million views, *Numberphile* almost 2 million subscribers and 300 million total views⁵².

In addition to their success with the public, the projects have received multiple prizes; The Periodic Table of Videos has received:

- The 2008 IChemE Petronas Award for *Excellence in Education and Training*;
- The 2011 Science Magazine’s Prize for *Online Resources in Education*;
- The 2011 Creativity International Platinum Award for *New Media*;
- The 2012 Webby Award for *Reality Online Film & Video*.

Moreover, in 2015 Professor Poliakoff was knighted by Queen Elizabeth II for his services in the chemical sciences and education⁵³. *Sitxy Symbols* has also received the 2016 Kelvin Medal (won by Brady Haran with Michael Merrifield and Philip Moriarty, the physicists collaborating on the channel). Haran and Poliakoff have published some papers and articles discussing the impact of these kind of projects, also highlighting the unexpected difficulties of measuring its real magnitude⁵⁴.

Channels like *Periodic Videos* and *Sitxy Symbols* are, of course, not exhaustive of the communication needs of an institution like a university or a research center, that needs also to provide informative content regarding the institution itself (for example, on courses and conferences); however, they can be used as examples of a successful way to bring research news to the public,

⁵² Retrieved on 11/12/2016

⁵³ [Nottingham chemist Martyn Poliakoff is knighted](#), BBC, 31/12/2014

⁵⁴ Haran and Poliakoff, 21/02/2011

and to link science to topical events – like the latest news or local discussions.

What is probably the key to the success of Periodic Videos is that it **never forgets about its viewers**: Haran, who conducts most of the interviews, often asks unexpected questions to the scientists, never editing out admissions of ignorance and experiment fails. While retaining the spontaneity of the scientists, the videos are professional and produced with broadcast-quality equipment, sitting well among the huge amount of quality content on YouTube.

At the same time, **the channel doesn't forget about the scientists either**: they are a constant presence, and the public can slowly come to know them as people and as professionals – with their differences in personality and in field of study. As Poliakoff writes⁵⁵:

“**Editorial control has been ceded to the nonscientist Haran**, which ensures that interviews are conducted from the perspective of our layperson viewers. In effect, the viewers accompany Haran on his exploration of chemistry, sharing his wonder while being spared the bits he finds boring. All of this probably works because **the participating scientists have done something that is increasingly unusual – they have trusted a journalist to tell their stories**.

We have also been lucky. With the right team and the right approach, we have been able to exploit YouTube to the benefit of chemists and chemistry students across the world. However, there are new opportunities on the Internet. Undoubtedly, some of these tools could also be adapted to deliver science to the public in new ways. Try to imagine how you could use these technologies, as well as other innovations that will shortly be going live, to communicate your passion for science to the world. **There is an audience out there waiting for you.**”

⁵⁵ B. Haran, M. Poliakoff, 2011

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12. APPENDIX: TABLES AND INTERVIEWS

The following pages contain the tables of all data collected for the analysis and the complete set of interview responses.

Specifically:

- Table I: number of subscribers;
- Table II: interactions on the most popular video on the channel;
- Table III: analysis of communicator continuity, speech rate and formats;
- The transcript of all interviews, conducted via Google Form;
- An excerpt from the list of FAQs sent by Henry Reich as a substitute to the interview (we selected only the relevant questions).

TABLE I – NUMBER OF SUBSCRIBERS

Channel name	Channel URL	Date of the analysis	Number of subscribers
University of California, Berkeley	https://www.youtube.com/user/ucberkeleycampuslife	02/11/2016	16539
Stanford University	https://www.youtube.com/user/StanfordUniversity	02/11/2016	568910
Princeton University	https://www.youtube.com/channel/UCcBYSgQTxc126-lj_gdrO8Q	02/11/2016	15134
Harvard University	https://www.youtube.com/user/Harvard	03/11/2016	336517
Massachusetts Institute of Technology (MIT)	https://www.youtube.com/user/MITNewsOffice	03/11/2016	182767
California Institute of Technology	https://www.youtube.com/user/caltech	03/11/2016	42074
University of Cambridge	https://www.youtube.com/user/CambridgeUniversity	03/11/2016	78217
The University of Tokyo	https://www.youtube.com/user/UTokyoPR	03/11/2016	2905
Swiss Federal Institute of Technology Zurich	https://www.youtube.com/channel/UCRNo2gqj3GiHImT_OnqkouA	03/11/2016	4727
University of California, Los Angeles	https://www.youtube.com/user/UCLA	10/11/2016	37141
University of Colorado at Boulder	https://www.youtube.com/user/univcoloradoboulder	10/11/2016	2388
Columbia University	https://www.youtube.com/user/columbiauniversity	10/11/2016	37531
University of Oxford	https://www.youtube.com/user/oxford	10/11/2016	69608
Pierre and Marie Curie University - Paris 6	https://www.youtube.com/user/UPMCUNIVERSITE/featured	10/11/2016	1140
University of California, Santa Barbara	https://www.youtube.com/user/UCSBNews	10/11/2016	1444
Northwestern University	https://www.youtube.com/user/NorthwesternU	10/11/2016	7060
Cornell University	https://www.youtube.com/user/CornellUniversity	10/11/2016	23652
University of Chicago	https://www.youtube.com/user/UChicago	10/11/2016	25351
Kyoto University	https://www.youtube.com/channel/UC3ikR0k6iSoz7DcdRsXS2xA	10/11/2016	209
AsapSCIENCE	https://www.youtube.com/user/AsapSCIENCE	11/11/2016	5871086
Smarter Every Day	https://www.youtube.com/user/destinws2/featured	11/11/2016	4307429
SciShow	https://www.youtube.com/user/scishow/featured	11/11/2016	3860762
Veritasium	https://www.youtube.com/user/1veritasium	11/11/2016	3772718
MinutePhysics	https://www.youtube.com/user/minutephysics	11/11/2016	3601041
Kurzgesagt - In a nutshell	https://www.youtube.com/user/Kurzgesagt	11/11/2016	3197863

TABLE II – INTERACTION ON THE CHANNEL MOST POPULAR VIDEO

Channel name	URL of the most popular video	views	likes	dislikes	comments	interactions
University of California, Berkeley	https://www.youtube.com/watch?v=mc6fluNTNEQ	23904	132	6	20	158
Stanford University	https://www.youtube.com/watch?v=VuSCErmoYpY	440841	611	60	148	819
Princeton University	https://www.youtube.com/watch?v=bkVhLJLG7uq	220784	1101	16	.	1117
Harvard University	https://www.youtube.com/watch?v=xK54Bu9HFRw	2061295	5624	406	.	6030
Massachusetts Institute of Technology (MIT)	https://www.youtube.com/watch?v= luhn7TLfWU	9579275	38957	1109	4192	44258
California Institute of Technology	https://www.youtube.com/watch?v=6poHQ2h00ZA	2197284	7371	233	2050	9654
University of Cambridge	https://www.youtube.com/watch?v=igJKaP0Sj5U	1085347	2416	31	192	2639
The University of Tokyo	https://www.youtube.com/watch?v=Oca6HrUvgxE	1227	15	0	.	15
Swiss Federal Institute of Technology Zurich	https://www.youtube.com/watch?v=4aHXZEepUfU	46680	147	2	23	172
University of California, Los Angeles	https://www.youtube.com/watch?v=vuiBTJZfeo8	40755	257	7	40	304
University of Colorado at Boulder	https://www.youtube.com/watch?v=qEtpwIjR5mY	67439	115	6	8	129
Columbia University	https://www.youtube.com/watch?v=nWXMIAEEI2g	5159	66	2	26	94
University of Oxford	https://www.youtube.com/watch?v=FA3LN4vqtlM	227839	391	7	43	441
Pierre and Marie Curie University - Paris 6	https://www.youtube.com/watch?v=Ke6u4Equ1Ms	7123	12	1	6	19
University of California, Santa Barbara	https://www.youtube.com/watch?v=YI3o236gdp8	98195	760	15	163	938
Northwestern University	https://www.youtube.com/watch?v=-q_4kgEclDg	76612	126	8	43	177
Cornell University	https://www.youtube.com/watch?v=REP4S0uqEOc	6844433	17066	2424	579	20069
University of Chicago	https://www.youtube.com/watch?v=JGfynrsdaV0	131886	723	10	70	803
Kyoto University	https://www.youtube.com/watch?v=xqz_NzrBV34	302	2	0	0	2
AsapSCIENCE	https://www.youtube.com/watch?v=AskAQwOBvhc	21495467	155917	9061	47078	212056
Smarter Every Day	https://www.youtube.com/watch?v=kxLoycj4pJY	45566883	207095	7609	9549	224253
SciShow	https://www.youtube.com/watch?v=QNJkcr7u2TY	6171668	42522	2387	8661	53570
Veritasium	https://www.youtube.com/watch?v=2OSrvzNW9FE	33804098	73066	840	2549	76455
MinutePhysics	https://www.youtube.com/watch?v=9eKc5kqPVrA	10571827	68624	2627	13482	84733
Kurzgesagt - In a nutshell	https://www.youtube.com/watch?v=ao8L-0nSYzq	9792916	235461	3184	15151	253796

TABLE III – STYLE OF THE VIDEOS

Channel name	Analyzed video URLs	Communicator continuity	Speech rate	Video format
University of California, Berkeley	https://www.youtube.com/watch?v=zU-KTIEhhA0	no	0	text over visuals
	https://www.youtube.com/watch?v=81Zv8PPF8bE	no	133,3333333	voice over visuals
	https://www.youtube.com/watch?v=tCphzt8iaWc	no	126,7924528	voice over visuals
	https://www.youtube.com/watch?v=ViXBQsirTeY	no	155,2173913	voice over visuals
	https://www.youtube.com/watch?v=jOUAIRbrv6s	no	0	text over visuals
Stanford University	https://www.youtube.com/watch?v=VuSCErmoYpY	no	193,1818182	interview
	https://www.youtube.com/watch?v=m5WodTppevo	no	131,4450867	interview
	https://www.youtube.com/watch?v=cmb5hn2X2ok	no	146	interview
	https://www.youtube.com/watch?v=j8zb44roDTM	no	132	interview
	https://www.youtube.com/watch?v=zDERCsYdK9g	no	155,7352941	interview
Princeton University	https://www.youtube.com/watch?v=bkVhLJLG7uq	no	0	text over visuals
	https://www.youtube.com/watch?v=YP-YWk3PvR8	no	164,5989305	interview
	https://www.youtube.com/watch?v=jVhcqtmGjMo	no	179,1818182	interview
	https://www.youtube.com/watch?v=HceG0IDhy40	no	178,4	voice over visuals
	https://www.youtube.com/watch?v=gt-4dC8Jlzw	no	100,3773585	interview
Harvard University	https://www.youtube.com/watch?v=xK54Bu9HFRw	no	0	text over visuals
	https://www.youtube.com/watch?v=cyjK0JhliuU	no	0	text over visuals
	https://www.youtube.com/watch?v=7Q_Fu1KIVac	no	0	text over visuals
	https://www.youtube.com/watch?v=LFwk303p0zY	no	0	text over visuals
	https://www.youtube.com/watch?v=2KRIRhNbxKg	no	150,6521739	interview
Massachusetts Institute of Technology (MIT)	https://www.youtube.com/watch?v= luhn7TLfWU	no	0	text over visuals
	https://www.youtube.com/watch?v=q4WsCMLnfvo	yes	178,9189189	voice over visuals
	https://www.youtube.com/watch?v=9ULPT4vYOlq	yes	169,5454545	voice over visuals
	https://www.youtube.com/watch?v=vbl2pJLSoyU&list=PLC9B6711584A06935&index=18	yes	156,8181818	voice over visuals
	https://www.youtube.com/watch?v=T3TqCr-LUqC0&list=PLC9B6711584A06935&index=30	no	135,7894737	interview

California Institute of Technology	https://www.youtube.com/watch?v=6poHQ2h00ZA	no	179,3258427	interview
	https://www.youtube.com/watch?v=JHve-itY2fGA&list=PLB01110EBAF8CAE3F&index=9	no	154,2363112	interview
	https://www.youtube.com/watch?v=Bo7RU-lxNPWg&list=PLB01110EBAF8CAE3F&index=27	no	168,9099526	voice over visuals
	https://www.youtube.com/watch?v=XczKXWvokm4&list=PLB01110EBAF8CAE3F&index=63	no	104,5429363	voice over visuals
	https://www.youtube.com/watch?v=c4FzBC8pqDc&list=PLB01110EBAF8CAE3F&index=77	no	136,8078176	interview
University of Cambridge	https://www.youtube.com/watch?v=jgJKaP0Sj5U	no	105,2459016	voice over visuals
	https://www.youtube.com/watch?v=0VIYpVEeHwk	no	118,0505415	voice over visuals
	https://www.youtube.com/watch?v=gAku0GwdkO8	no	126,6666667	voice over visuals
	https://www.youtube.com/watch?v=1T5_NIRs-5o	no	148,1818182	interview
	https://www.youtube.com/watch?v=5iVKrnod34I	no	177,4262735	interview
The University of Tokyo	https://www.youtube.com/watch?v=Oca6HrUvgxE	no	72,57142857	voice over visuals
	https://www.youtube.com/watch?v=tyZsM90v8tU	no	0	text over visuals
	https://www.youtube.com/watch?v=WoQVzw31cBo	no	137,7777778	interview
Swiss Federal Institute of Technology Zurich	https://www.youtube.com/watch?v=4aHXZEepUfU	no	122,1621622	interview
	https://www.youtube.com/watch?v=e6DPagbsLjU&list=PLI5qMeij3ip-PurLtH6SUSK8CT2eR99Lru&index=1	no	122,5899281	interview
	https://www.youtube.com/watch?v=VFqfxUYfjdk&index=11&list=PLI5qMeij3ipPurLtH6SUSK8CT2eR99Lru	no	101,9318182	interview
	https://www.youtube.com/watch?v=hTBerDmahoU&index=30&list=PLI5qMeij3ipPurLtH6SUSK8CT2eR99Lru	no	171,971831	interview
	https://www.youtube.com/watch?v=l32vwCxeGYg&list=PLI5qMeij3ip-PurLtH6SUSK8CT2eR99Lru&index=41	no	135,8426966	interview
University of California, Los Angeles	https://www.youtube.com/watch?v=vuiBTJZfeo8	no	127,7922078	vlog
	https://www.youtube.com/watch?v=vibB851ZS3o&index=10&list=PLA967BAC2B32D44DF	no	171,1598746	interview
	https://www.youtube.com/watch?v=21iC4YEgOAs&list=PLNhVwA0XZE27h8uh8uq8kX3362W2CAvai&index=4	no	153,5135135	voice over visuals
	https://www.youtube.com/watch?v=HxW6t-Htbzs&index=2&list=PLNhVwA0XZE24DtB2d17UvYm2-RKdqqQQ8	no	125,2682927	interview

	https://www.youtube.com/watch?v=cdd3UeYR_wQ&index=1&list=PL4DFA4C87B309C0A9	no	197,9661017	interview
University of Colorado at Boulder	https://www.youtube.com/watch?v=qEtpwljR5mY	no	146,4285714	interview
	https://www.youtube.com/watch?v=YW-mTlywbQ0&index=2&list=PL0DF2jNccX051VsXFF2Nyv4PMEluNP1i3	no	157,6859504	interview
	https://www.youtube.com/watch?v=CCMxQD0pEnI&index=20&list=PL0DF2jNccX051VsXFF2Nyv4PMEluNP1i3	no	149,375	interview
	https://www.youtube.com/watch?v=NGmPyFI-FXBM&list=PL0DF2jNccX051VsXFF2Nyv4PMEluNP1i3&index=39	no	150,6521739	interview
	https://www.youtube.com/watch?v=4yehwrd-KRGM&list=PL0DF2jNccX051VsXFF2Nyv4PMEluNP1i3&index=41	no	175,5737705	interview
Columbia University	https://www.youtube.com/watch?v=nWXMIAEEI2g	no	165	interview
	https://www.youtube.com/watch?v=rMKHYB0Uv9k	no	0	text over visuals
	https://www.youtube.com/watch?v=K8TB66FOhQE	no	156,4044944	interview
	https://www.youtube.com/watch?v=8LvVn6iLaPs	no	161,3114754	interview
	https://www.youtube.com/watch?v=KCHNcl0vfSo&list=PLf1Dab4lwQhA8fLTS9fp2qrxkhFm9CseH&index=13	no	183,0232558	interview
University of Oxford	https://www.youtube.com/watch?v=FA3LN4vqtIM	no	198,3815029	interview
	https://www.youtube.com/watch?v=Y-pIP0aECZQ&list=PLjqO-QqeHQ3u9bsw4I6NQRNQ-G0zOJvB2&index=2	no	146,3874346	interview
	https://www.youtube.com/watch?v=SFSdlc5711M&list=PLjqO-QqeHQ3u9bsw4I6NQRNQ-G0zOJvB2&index=12	no	153,5526316	interview
	https://www.youtube.com/watch?v=2iQaDeGSj1w&list=PLjqO-QqeHQ3u9bsw4I6NQRNQ-G0zOJvB2&index=20	no	180	interview
	https://www.youtube.com/watch?v=Ys4gliaCMZ8&list=PLjqO-QqeHQ3u9bsw4I6NQRNQ-G0zOJvB2&index=43	no	166,2264151	interview
Pierre and Marie Curie University - Paris 6	https://www.youtube.com/watch?v=Ke6u4Equ1Ms	no	148,0519481	interview
	https://www.youtube.com/watch?v=MieyLdTvT4	no	160	voice over visuals
	https://www.youtube.com/watch?v=xRADq7oge7g	no	150,7317073	voice over visuals
	https://www.youtube.com/watch?v=chQtQnLRXVg&list=PLCKqh5eSreZ2EzSxVhktCBPzSrl5HWWn&index=8	no	160,4494382	voice over visuals
	https://www.youtube.com/watch?v=eqvaBAA8xo4	no	135,5555556	interview
University of California, Santa Barbara	https://www.youtube.com/watch?v=YI3o236qdp8	no	144,9350649	interview
	https://www.youtube.com/watch?v=xQTVt8dJIOI&list=PLXEfGFwHw-SKkKX25t4Bn8eERcAQ3xV6Aq&index=2	no	185,625	interview

	https://www.youtube.com/watch?v=BF3gaDsXIPA&list=PLXefGFwHw-SKkKX25t4Bn8eERcAQ3xV6Ag&index=8	no	169,2857143	interview
	https://www.youtube.com/watch?v=jmiZGI2VkiA	no	144,2857143	interview
	https://www.youtube.com/watch?v=OWbanx8U4cM	no	146,4	interview
Northwestern University	https://www.youtube.com/watch?v=-q_4kgEcLdq	no	95,09433962	interview
	https://www.youtube.com/watch?v=b9tmOyrIIYM	no	0	voice over visuals
	https://www.youtube.com/watch?v=kn32vavZqvg	no	121,7821782	voice over visuals
	https://www.youtube.com/watch?v=oHfDoK0cwE4	no	133,6170213	interview
	https://www.youtube.com/watch?v=13H9B8BTp5c	no	116	interview
Cornell University	https://www.youtube.com/watch?v=REP4S0uqEOc	no	83,32344214	voice over visuals
	https://www.youtube.com/watch?v=GnnTVjgSuEs	no	142,2352941	interview
	https://www.youtube.com/watch?v=zyOwl0zA6SM	no	182,3728814	interview
	https://www.youtube.com/watch?v=sL7tDoLnDsA	no	169,1338583	voice over visuals
	https://www.youtube.com/watch?v=ukO_95TIqPc	no	120	presentation
University of Chicago	https://www.youtube.com/watch?v=JGfynrdsdV0	no	170,2597403	interview
	https://www.youtube.com/watch?v=7QaPmCRhr80&index=1&list=PLmPDDhOPKASi2eGiSBckYOhKuzy4_8jRU	no	153,3783784	interview
	https://www.youtube.com/watch?v=VdU5szZLn7o&index=11&list=PLmPDDhOPKASi2eGiSBckYOhKuzy4_8jRU	no	129,1764706	voice over visuals
	https://www.youtube.com/watch?v=n1KkMQxTM6E&index=25&list=PLmPDDhOPKASi2eGiSBckYOhKuzy4_8jRU	no	199,9126638	interview
	https://www.youtube.com/watch?v=5S_gw5SSiX4&index=38&list=PLmPDDhOPKASi2eGiSBckYOhKuzy4_8jRU	no	166,0773481	interview
Kyoto University	https://www.youtube.com/watch?v=FSsjQsjOQDw&index=4&list=PLvEOulZFm6ChA7QsF8VCBuYqxr4rMaLe	no	0	text over visuals
	https://www.youtube.com/watch?v=tkUPP9dzu38&index=8&list=PLvEOulZFm6ChA7QsF8VCBuYqxr4rMaLe	no	0	text over visuals
	https://www.youtube.com/watch?v=Wbvvo6bBZk&list=PLvEOulZFm6ChA7QsF8VCBuYqxr4rMaLe&index=1	no	0	text over visuals
	https://www.youtube.com/watch?v=0weawO8Jwz4&index=6&list=PLvEOulZFm6ChA7QsF8VCBuYqxr4rMaLe	no	0	text over visuals
	https://www.youtube.com/watch?v=xqz_NzrBV34&index=11&list=PLvEOulZFm6ChA7QsF8VCBuYqxr4rMaLe	no	0	text over visuals
AsapSCIENCE	https://www.youtube.com/watch?v=AskAQwOBvhc	yes	219,5238095	voice over visuals
	https://www.youtube.com/watch?v=PwRCZE0-P2l	yes	169,1320755	voice over visuals
	https://www.youtube.com/watch?v=cRsJB0taAak	yes	195,1401869	voice over visuals
Smarter Every Day	https://www.youtube.com/watch?v=kxLoycj4pJY	yes	200,201005	hosted

	https://www.youtube.com/watch?v=79rYbkTi4fs	yes	192,1100917	hosted
	https://www.youtube.com/watch?v=05oOst9kZXQ	yes	210,2521008	hosted
SciShow	https://www.youtube.com/watch?v=QNJkcr7u2TY	yes	212,8301887	vlog
	https://www.youtube.com/watch?v=RWMYNTnoEvQ	yes	236,0071942	vlog
	https://www.youtube.com/watch?v=aQxZFGuDU_s	yes	225,3383459	vlog
Veritasium	https://www.youtube.com/watch?v=2OSrvzNW9FE	yes	178	voice over visuals
	https://www.youtube.com/watch?v=WlyTZDHuarQ	yes	198,7826087	vlog
	https://www.youtube.com/watch?v=2_OEsf-1qgY	yes	183,1294964	hosted
	https://www.youtube.com/watch?v=c6wuh0NRG1s	yes	175,4394299	voice over visuals
MinutePhysics	https://www.youtube.com/watch?v=9eKc5kgPVrA	yes	200,1869159	voice over visuals
	https://www.youtube.com/watch?v=0iJZ_QGMLD0	yes	182,8169014	voice over visuals
	https://www.youtube.com/watch?v=qRnU0bgsyq0	yes	225,7731959	voice over visuals
Kurzgesagt - In a nutshell	https://www.youtube.com/watch?v=ao8L-0nSYzq	yes	197,771261	voice over visuals
	https://www.youtube.com/watch?v=mZsaaturR6E	yes	164,64	voice over visuals
	https://www.youtube.com/watch?v=xZbcwi7SfZE	yes	174,789916	voice over visuals

Interviews

1. Massachusetts Institute of Technology

What procedure do you follow when producing a new video for the channel you manage? If you were to summarize it in 5 steps, what would these steps be?

Conceptualize. Gather assets/plan (pre-production). Schedule shoots. Film. Edit/deliver final product.

How many people work on the production of a video for your channel, usually? And how many people do you think should work on one?

One. There should be more than one. There should be someone responsible for filming, while the other produces. Ideally an audio person on set too.

How long does the production of one video lasts, usually?

Varies greatly. I have a unique situation where its really hard to explain how long it takes. I'm constantly toggling between projects due to deadlines and other factors.

On how many online platforms are your videos published (without any change)? Which ones?

Hosted/published on YouTube. Published on mit.edu and news.mit.edu. Of course it is also embedded across a wide varieties of websites in the news/media etc.

If you publish the videos after some changes: what adjustments do you make?

-

Do you have an ideal user in mind when you start designing a new video?

The general public. My goal is to make the content of our videos accessible to the average person regardless of their level of education.

Have you ever experienced an unexpected number of dislikes on one of your videos? If so: what do you think the reason was?

I always expect to get dislikes. The internet is a weird place. I don't think there is a reason other than people are people and they like to dislike things. I don't really think in the case of my videos there is any clear reason. If the content was more provocative perhaps we could make some educated assumptions.

If don't: how would you have reacted?

-

How would you react to an offensive comment on one of your videos?

We typically let viewers comment and interact with each other without interference from us. There have been specific instances where a comment made a person, featured in a video, feel threatened/uncomfortable, and in that particular case we of course removed said comment.

What would you do if a commenter doubted the scientific validity of the content?

Nothing.

What would you do if a user added anti-scientific comments to one of your videos?

Nothing. Unless it is threatening or evokes acts of violence or personally attacks a subject featured in a manner that makes that subject uncomfortable, we tend to let the users be.

Is there a YouTube channel you particularly admire?

-

If you received a collaboration proposal from another YouTube channel (like a university or a youtuber), to produce a video together, would you accept? Which limits would you set?

-

Describe the YouTube channel you manage using 4 words.

Interesting. Dynamic. Thought-provoking. Entertaining.

2. UC Berkeley

What procedure do you follow when producing a new video for the channel you manage? If you were to summarize it in 5 steps, what would these steps be?

1. When a story idea arises (through discussion with our Public Affairs Department writers, our independent research, or suggestions from outside our office), we discuss it at our weekly news team meetings, to assess its potential newsworthiness, logistics, target audience, etc, in order to decide whether to produce it.
2. Pre-interview the people who could possibly be interviewed on camera and discuss logistics and possible additional footage
3. Shoot interviews and illustrative footage
4. Write script
5. Edit

How many people work on the production of a video for your channel, usually? And how many people do you think should work on one?

Two, sometime three, if we need to enlist the services of a graphic artist and/or if we need extra help to set up a shoot.

How long does the production of one video lasts, usually?

The combined total hours of work to produce one fully-packaged video, including multiple interviews, bRoll, graphics, music, is 3-5 days, or longer if we're building more involved graphic animations.

On how many online platforms are your videos published (without any change)? Which ones?

We send most of our videos to the news media, accompanied by written stories. Sometimes the news media will post our video on their site, or use our footage to create their own videos. We also post our videos on numerous websites of UC Berkeley (homepage, news page, relevant department pages.) The videos also are posted on Berkeley's YouTube, facebook and Twitter pages.

If you publish the videos after some changes: what adjustments do you make?

We usually don't make changes.

Do you have an ideal user in mind when you start designing a new video?

General audience

Have you ever experienced an unexpected number of dislikes on one of your videos? If so: what do you think the reason was?

Just once, we got several negative comments about a story about UC Berkeley's research into the science of happiness. The commenters didn't think such research was worthy or necessary.

If don't: how would you have reacted?

-

How would you react to an offensive comment on one of your videos?

If it was profane, I would remove it; Otherwise, I would ignore it, not respond. If the comment was negative, but serious, I would respond briefly, providing more information or an explanation.

What would you do if a commenter doubted the scientific validity of the content?

I would show the comment to our scientist to ask for a response.

What would you do if a user added anti-scientific comments to one of your videos?

Probably ignore it.

Is there a YouTube channel you particularly admire?

deep look: https://www.youtube.com/results?search_query=deep+look

If you received a collaboration proposal from another YouTube channel (like a university or a youtuber), to produce a video together, would you accept? Which limits would you set?

Yes. I would agree to participate, only if I had final approval of the video.

Describe the YouTube channel you manage using 4 words.

Innovation news from Berkeley

3. Harvard University

What procedure do you follow when producing a new video for the channel you manage? If you were to summarize it in 5 steps, what would these steps be?

1. Scope subject matter/create storyboard 2. Shoot video and b-roll 3. Produce final video 4. Approve 5. Disseminate online

How many people work on the production of a video for your channel, usually? And how many people do you think should work on one?

For ones created within Harvard Public Affairs & Communications (we mostly feature videos created by other schools/office, e.g. Harvard Kennedy School), we have three videographers. Ideal number of producers depends on the video, but for ours, I think 3 - 4 is good.

How long does the production of one video last, usually?

On average, I'd say 1 – 2 months. But some projects are more in-depth, while others need very quick turnaround.

On how many online platforms are your videos published (without any change)? Which ones?

If appropriate, we'll publish them on Facebook, too

If you publish the videos after some changes: what adjustments do you make?

If we also upload to Facebook, we'll either add captions or text overlay so viewers don't need audio. We'll often shorten the videos too, and remove the header/footer since we need to grab attention quickly.

Do you have an ideal user in mind when you start designing a new video?

Depends on the video, but most often it's for an international audience, Harvard alumni, or those generally interested in Harvard's impact

Have you ever experienced an unexpected number of dislikes on one of your videos? If so: what do you think the reason was?

Luckily, no!

If don't: how would you have reacted?

If we received many dislikes, I would look at it from an analytical perspective and try to find out what about the video made our audience dislike it.

How would you react to an offensive comment on one of your videos?

For Harvard, that's unfortunately typical because people use the popularity of our videos as a platform to express their opinions — even if offensive. This is why we disable comments from all our videos, so we don't have to react at all.

What would you do if a commenter doubted the scientific validity of the content?

We wouldn't do anything. We release so much content that we don't have time to regard people individually.

What would you do if a user added anti-scientific comments to one of your videos?

We wouldn't do anything, because thankfully, our comments are private, and it would be too cumbersome to hide each of these offensive remarks.

Is there a YouTube channel you particularly admire?

Late Night with Jimmy Fallon: quick turnaround for easy social sharing!

If you received a collaboration proposal from another YouTube channel (like a university or a youtuber), to produce a video together, would you accept? Which limits would you set?

That decision would be out of my hands, unfortunately, and dependent on the higher-ups here at Harvard.

Describe the YouTube channel you manage using 4 words.

Abundant, educational, informative, fun

4. ETH Zurich

What procedure do you follow when producing a new video for the channel you manage? If you were to summarize it in 5 steps, what would these steps be?

briefing (research), planning, shooting, editing, translations, uploads

How many people work on the production of a video for your channel, usually? And how many people do you think should work on one?

2-5 people work on it, there should be at least 2 person

How long does the production of one video lasts, usually?

can be between 1 week to 1 year. for news its one week from the idea to the edit, but not fully filled with production of course.

On how many online platforms are your videos published (without any change)? Which ones?

matterhorn (our own platform), youtube, instagram, facebook

If you publish the videos after some changes: what adjustments do you make?

do not understand the question

Do you have an ideal user in mind when you start designing a new video?

yes

Have you ever experienced an unexpected number of dislikes on one of your videos? If so: what do you think the reason was?

no - but usually it's about the wrong title so that people get disappointed.

If don't: how would you have reacted?

not, you cannot do anything.

How would you react to an offensive comment on one of your videos?

from answering to deleting

What would you do if a commenter doubted the scientific validity of the content?

call the professor, then arguement with the person, explain

What would you do if a user added anti-scientific comments to one of your videos?

It's not the case, luckily

Is there a YouTube channel you particularly admire?

BBC

If you received a collaboration proposal from another YouTube channel (like a university or a youtuber), to produce a video together, would you accept? Which limits would you set?

depends on the conditions, the university politics etc.

Describe the YouTube channel you manage using 4 words.

-

5. The University of Tokyo | UTokyo

What procedure do you follow when producing a new video for the channel you manage? If you were to summarize it in 5 steps, what would these steps be?

In addition to the main official YouTube channel, a number of the University's Faculties/Graduate Schools, Institutes, etc. have separate channels that they manage on their own. One of the roles of the main YouTube channel is to aggregate videos published throughout the University, and the making of these videos is often handled by Faculties/Graduate Schools, etc.

The production process for our videos cannot be summarized as it varies depending on the content.

How many people work on the production of a video for your channel, usually? And how many people do you think should work on one?

As with the previous question, the number of people working on our videos varies. For example, for a university introduction video, more than 10 individuals may be involved working in cooperation with professional staff, while for a video showcasing research, there may be only 1-2 people involved.

How long does the production of one video lasts, usually?

The amount of time varies based on the video content. There are some that take as little as several hours, and some that take more than three months to make.

On how many online platforms are your videos published (without any change)? Which ones?

We post some of our videos to our social media accounts (Twitter, Facebook, Google+).

If you publish the videos after some changes: what adjustments do you make?

We did not understand this question.

Do you have an ideal user in mind when you start designing a new video?

Yes, we decide who the videos are intended for when we make them.

Have you ever experienced an unexpected number of dislikes on one of your videos? If so: what do you think the reason was?

While they are few in number, we have received some "dislikes" on our videos. We believe that these dislikes just express the thoughts of some of the individuals that are watching the videos. Also, we consider these dislikes to be valued opinions of our videos' viewers, so we want to use them as indicators to gauge opinions on our videos.

If don't: how would you have reacted?

-

How would you react to an offensive comment on one of your videos?

We currently have commenting disabled so we have not had to react, but we are considering enabling comments sometime in the future. If we do enable comments, we will, of course, delete comments that contain spam or personally identifiable information. However, if a comment is simply expressing a negative opinion, we will leave it on the video.

What would you do if a commenter doubted the scientific validity of the content?

Since those are personal opinions, we would leave the comments as they were.

What would you do if a user added anti-scientific comments to one of your videos?

Since those are personal opinions, we would leave the comments as they were.

Is there a YouTube channel you particularly admire?

-

If you received a collaboration proposal from another YouTube channel (like a university or a youtuber), to produce a video together, would you accept? Which limits would you set?

This depends on the content of the proposal.

And finally... Describe the YouTube channel you manage using 4 words.

-

6. Kurzgesagt

What procedure do you follow when producing a new video for the channel you manage? If you were to summarize it in 5 steps, what would these steps be?
research, script, design, narration, animation, sound

How many people work on the production of a video for your channel, usually? And how many people do you think should work on one?
8

How long does the production of one video lasts, usually?
4-20 weeks

On how many online platforms are your videos published (without any change)? Which ones?
Youtube

If you publish the videos after some changes: what adjustments do you make?
-

Do you have an ideal user in mind when you start designing a new video?
no really

Have you ever experienced an unexpected number of dislikes on one of your videos? If so: what do you think the reason was?
we talked about politics

If don't: how would you have reacted?
-

How would you react to an offensive comment on one of your videos?
depends on how offensive it is. From ignoring to banning.

What would you do if a commenter doubted the scientific validity of the content?
nothing, happens all the time on the internet.

What would you do if a user added anti-scientific comments to one of your videos?
Ban

Is there a YouTube channel you particularly admire?
loads. CGPGrey and Crash Course to name two

If you received a collaboration proposal from another YouTube channel (like a university or a youtuber), to produce a video together, would you accept? Which limits would you set?
Most likely no. The truth is it seldomly is worth the time. The other channel needs to be about our size for it to make sense. An institution can sponsor us and collaborate with us this way but we don't do it for free.

Describe the YouTube channel you manage using 4 words.
explaining complicated stuff nicely

7. MinutePhysics

How do you get ideas for your videos?

All over the place! Sometimes things I learned when I was actively studying physics, sometimes from books or articles or papers I read or questions people ask me (friends or viewers), or sometimes I'll see something interesting and it'll be the seed for a video. The real trick, in fact, isn't coming up with ideas – it's figuring out which ideas are actually interesting enough to make into a video, and then picking between those which to make next.

Will you collaborate with me on a video?

When I was first starting on YouTube, I would do collaborations with other creators of similar size and focus in order to cross-promote our channels and meet new people, and I suggest you do the same! However, at this point I mainly do collaborations with friends/colleagues/other people I already know – there are a ton of them who I'm excited to work with and never have.

How do you make money on youtube? (I usually get asked this one by my friends' parents)

Ads, Sponsorships, Crowdfunding, Licensing, Merchandise, Consulting/Speaking gigs

Do you want to join our YouTube Network (aka MCN)?

I have never understood the benefits of joining a youtube network, despite getting emails every week for years from people trying to convince me otherwise. They kind of just seem like a giant Ponzi scheme to me.

You have a mistake in your video

I have mistakes in lots of my videos – such is the nature of making technical content (sometimes you mess up). Also, because youtube doesn't allow swapping out of video files, the only way to fix mistakes is delete and completely re-upload from scratch, which just isn't worth it for small errors (spelling, etc). Also, most of the time the things I actually get wrong are very different from the things people think I get wrong – there's a lot more subtlety to physics beyond what you learn in high school/first year university and part of my goal making these videos is to expose everyone to more of that physics! Which unfortunately means that sometimes people who've had a little bit of training will think there are mistakes, when actually it's their schooling that's incomplete. But, if you still think there's a mistake in a new video, please let me know – I'm always eager to learn.

Why do you talk so fast in your videos?

I tend to talk faster when I get excited about something! Also it keeps people engaged/interested in the videos, they have to be on their toes to follow along so they never have any time to think "maybe I should go watch something else..."

I have a physics question: will you answer it?

Perhaps. Is it a homework question? Then no. But if it's a legitimate question that you haven't been able to find an answer to, then by all means. Many of my videos are inspired by questions people ask me – sometimes I think the question is so cool I make a video answering it, but more often the question inspires me to think of something else cool I've been wanting to make a video about.

What did you study in school?

Math and physics BA at Grinnell College in Iowa. Theoretical physics MS at the Perimeter Institute for Theoretical Physics/University of Waterloo in Ontario. I almost started a PhD in physics at CU Boulder, but didn't in order to go to LA to focus on film/video. I also started an MFA in film at the University of Southern California but dropped out after a semester to make YouTube videos full time.

I really want to start a successful youtube channel. Do you have any advice?

Watch these videos:

<https://www.youtube.com/watch?v=YoQcg39Krvk>

<https://www.youtube.com/watch?v=Cv5ldhxpLA>

<https://www.youtube.com/watch?v=QLIKgT-OSLQ>

<https://www.youtube.com/watch?v=vhRjMFRChSq>

<https://www.youtube.com/watch?v=0fjE1A80w2s>