Limit Less

Good practice guide for promoting physics on social media

IOP Institute of Physics

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Contents page

The Institute of Physics (IOP) is the professional body for physics in the UK and Ireland. We know that physics has a vital role to play in tackling the challenges of the 21st century and helping make the UK and Ireland fit for a better future.

We promote the benefit of physics to society and encourage everyone, regardless of background to engage with physics. The IOP wants to encourage young people from all parts of society, from all groups and backgrounds, especially those who are currently underrepresented in physics, to see that physics is for them.

This is why we have launched the *Limit Less* campaign (**iop.org/LimitLess**). We aim to support young people to change the world – their world – and fulfil their potential by doing physics. We want to increase the number of young people from underrepresented and underserved groups in our society who do physics from age 16.

As part of our campaign, we have produced advice to support anyone who uses social media in describing, illustrating and presenting physics in an accurate, modern and unbiased way. We want to demonstrate that it is something to be discovered, enjoyed and explored by all.

By putting this advice into practice, we hope you can help us to inspire young people into a less limited future and promote continued diversity across the whole of society.

Rachel Youngman,
Deputy Chief Executive of the Institute of Physics and Executive Lead for the Limit Less campaign.

The image of physics

“I was told I was not smart enough for physics and that if I didn’t want to be an engineer there was no point.”

“Physics to me was always for the privileged; for those who can afford time.”

“Physics is not for everyone.”

“Our physics teacher told us that girls don’t do as well in physics.”

How to promote good physics

Welcome to our practical guide to producing online physics content in a way that is appealing and approachable to a wide audience from all backgrounds.

This will help us move towards a physics community that is more reflective of our society. And that means better physics!

The common theme throughout the quotes on page 7 is the notion that physics is for a select group of people characterised by privilege and even genius. This image can lead to people, often from underrepresented groups, not pursuing physics as a career path even if they want to.

For those of us sharing our passion for physics online, it is therefore crucial that we portray physics in a positive way.

Avoid portraying physics as "too difficult"

Inclusive: Information that reflects the true nature of doing physics.

This video (**bit.ly/3aryK8g**) is a good example. It encourages the viewer to investigate physics and portrays the subject more accurately as a community effort, building on the work of others.

Exclusive: Stereotypes and myths about physics that create barriers to engagement.

A video that refers to physics being hard, even if it's done in the nature of clickbait or a joke. It might, for example, suggest physics is hard because it is maths heavy.

Avoid portraying physics as a discipline for a narrow group of people

Instead, include stories and experiences from people of a range of backgrounds.

Inclusive: In this video (**bit.ly/3qWxXW9**), Dr Mithuna Yoganathan talks about her path toward studying physics, explaining that she wasn't good at maths in her high school

years (16–19) but because she loved it, she was determined to study it and now has a doctorate from the University of Cambridge.

Exclusive: Videos in which the only representation of physicists is the stereotypical "lone genius".

Read more about how to avoid this in the **Challenging Stereotypes section.**

Physics content

Social media is a space where much is said in the name of physics, and it is important to ensure that content is accurate by design. We also need to be aware of how the practice of physics is portrayed; physics is more than a set of facts and explanations.

Promote correct information

Try to ensure content comes from a trusted source. Consider consulting a physics educator who works with a similar age group to your audience.

Good: Content that is accurate within the accepted and well–established theories and ideas of physics.

Bad: Incorrect information about the laws of physics and the misappropriation of them to prove a point.

Avoid explaining away phenomena

Good: Explanations that illuminate and invite discussion and further thought.

Bad: Statements of "this is just how it is" that presents all physics as being based on fixed facts.

Try to take time to explain what a law means, elaborate, then give more contextual examples.

Good: Persuades the listener and creates understanding or insight into a phenomenon or behaviour.

Bad: Simply stating that a phenomenon occurs because of a law in physics or implying physics is magic.

Use clear, consistent, and contextual explanations

Determine the purpose of the content first, tailor your explanations to this purpose and use demonstrations, simulations, and graphics to enhance them. If possible, ensure it relates to the experiences of the audience and refer to the impact of science on society.

If jargon is unavoidable, try to ensure that you only introduce technical language or equations once the foundations are understood. For example, the terms kinematics or SUVAT can be confusing if the audience has no prior knowledge. This depends on the audience of your content, but generally, remember to explain your jargon.

Audience plays an important role in delivering content; how you portray your content for younger students is very different from university students or parents.

A good example of this is the IOP's **Do Try This at Home** content compared to the **Marvin and Milo** content. The Do Try This at Home episodes are aimed at parents who may not have a physics background, so they include in-depth explanations and diagrams to aid the parents. In contrast, the Marvin and Milo cartoons are aimed at teachers as fun, quick, enrichment activities they can use as part of a lesson, so they are short and to the point.

Further reading:

Glossary – provides an authoritative voice that can help give confidence to all those involved in physics communication in the correct and consistent use of quantities.

Inclusive teaching tips – aimed at teachers, this document provides guidance on inclusivity for anyone producing educational content.

Challenging stereotypes in physics

"You can't be what you can't see"

Influencing young people is key to making the physics community bigger and more diverse. However, **research from Education and Employers** indicates that stereotypes have a limiting effect on children's career aspirations from as young as 7 years old.

Improving representation is one of the ways we can help improve access to physics.

By having a more diverse range of people discussing physics on social media, we can help more young people identify with the physics community.

A diverse set of presenters is a good start to addressing issues of inequality, through increasing the diversity of people we see and hear doing science. This can widen the impression of who can do science and therefore the amount of young people who see science as 'for them'.

"As students get older, more of them tend to draw male scientists: In kindergarten, children draw roughly the same number of male and female scientists—girls tend to draw more female scientists while boys tend to draw more male ones. But by the time they're in high school, students—males and females combined—draw four times as many male scientists as female ones."

50 Years of the Draw-a-Scientist Test | Edutopia

Challenging stereotypes

Research into what attracts or deters young people in respect of STEM subjects shows that the dominant educational and social representations of science are still overwhelmingly 'masculine' and focused on 'cleverness'.

Whilst it may seem positive to praise young people for having interest in a 'smart' subject, this can however put off young people who feel that they are not 'naturally gifted' or who think that these subjects are only for the smartest kids in the class, rather than for anyone. This reinforces the idea of physics being an 'elite' subject rather than a subject you can work hard at like anybody else.

We know that stereotypical or negative representations of physicists encountered on social media influence young people into thinking that physics isn't a subject that they should explore. This is reinforced when most of the physicists that people see and hear about are from a narrow pool of society. This fails to display the diversity currently within physics and limits the growth and expansion of the discipline.

HOW TO PROMOTE GOOD PHYSICS ON SOCIAL MEDIA

how to communicate physics clearly, engage your audience, and build a following on social media

iop.org/SocialMediaGuide

drawn by @missneutrino, 2021

CHECK YOUR SOURCES
talk to a specialist, or read material written by one

IT'S NOT TOO TOUGH
portraying physics as super difficult creates barriers to inclusivity

NO JARGON
keep your language clear & simple

BLAH

IT'S NOT MAGIC
give proper explanations for the physical phenomena you talk about

KEEP IT RELEVANT
make sure your explanations capture the real world

DON'T FEED THE TROLLS!

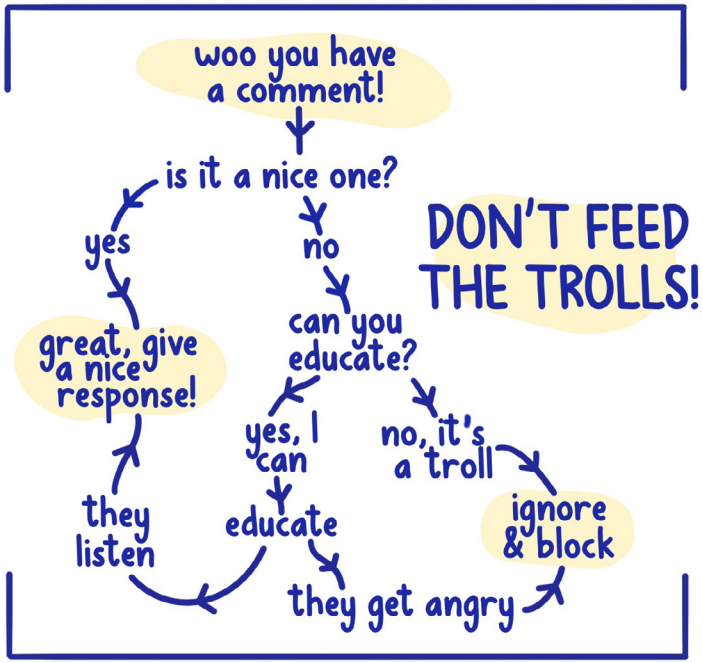

IMAGE SIZES (in pixels)

1200x675

700 x 800

1200x620

for two images

1080 x 1080

using images and videos in your posts boosts shares, and increases memory retention

check the best times to post for your platform

ACCESSIBILITY CONSIDERATIONS

limit emoji use

alt text, pic & video descriptions

alt text

subtitles in videos

cc whatever you're saying

keep text large & clear

abc ✓ abc ✗

ensure text on images is high contrast

elevate the voices of others

make sure to keep online spaces inclusive and showcase the diversity of physics

use inclusive language

hey everyone

don't use special characters or "fancy fonts"

Nope

use PascalCase in hashtags

#LikeThis

"Elevating the voice of others" – Sharing platforms and collaborating

It can be easy to fall into the trap of only collaborating with, or promoting the content of, people like you. This occurs because our existing circles are often very similar to us – similar place of work, education, upbringing, but also similar ethnicity, neurodiversity, gender, sexual orientation, or class. People can often defend a lack of diversity by saying they just don't know any "_____ physicists". Just because you don't know any doesn't mean they aren't out there! Increasing the diversity of people you work with is not only good for representation, but it can also increase the diversity of thoughts and ideas.

- Ensure that screen time and speech are shared fairly.
- Sharing posts, articles, tweets, and videos from a diverse range of creators can help show your audience the variety of people discussing physics on the internet.
- Giving shout-outs and recommendations to your audiences about other creators that you think they should follow too.
- You can also invite other creators to collaborate with you, such as writing blogs for each other's websites and featuring in each other's videos. This also provides an opportunity to reach new people who may be part of each other's audiences.

Look at the roles in your content

We conducted a meta-analysis of 47 science channels on YouTube, with a combined subscribership of over 160 million. When channels were presented by individuals, white male presenters outnumber non-white-male presenters nearly 2:1.

Even if videos are animated, they are often still narrated by male voices.

If you are producing content as a group, it is important to pay attention to roles – getting a good mix of people on screen is not enough. Is the person leading an experiment always male? Is the person presenting always white? Having a diverse cast but keeping roles very rigid can reinforce power imbalances and place minoritised groups in subordinate roles.

White male presenter(s)	17
Mixed team/ multiple presenters	14
Non-white-male presenter (s)	9
Animation/Visuals	7

Avoid tokenism

In broadening representation in videos, avoid the appearance of tokenism or 'shallow diversity'. An example could be adding a disabled physicist into your video but not giving them a speaking role. It can also be seen as tokenistic if an individual is included merely because of their identity and not because of their expertise. When including a more diverse range of physicists in your social media, it is important to emphasise their interests and field of expertise. Recognise people as physicists first and foremost.

It is also important that diverse voices are not brought out to talk only about diversity. They should be heard talking about the field they work in too. It is unfair to expect individuals to be experts in diversity and inclusion just because of certain identity characteristics they may have, and you shouldn't demand people from underrepresented and underserved groups to share their lived experiences or educate others. Providing opportunities for people to discuss these issues is good, but making it an unpaid responsibility is not.

Here are some groups/channels promoting and elevating diverse voices in physics:

- The Blackett Lab Family
- Lightyear Foundation
- Neurodivergent in STEM
- LGBTQ+ STEM
- Black Women in Science
- Pride in STEM

If you are a group working in this field and would like to be added to this list, please email us here:

campaigns@iop.org

Accessibility

Our Limit Less campaign is focused on ensuring that the physics community is more diverse and inclusive and there is a role for us all to play in making this a reality. Here are some easy to implement tips to help ensure your social media is accessible to a wide range of people. We have also included a list of sites that expand on accessibility at the end of this guide.

- **Start with accessibility and assistive technology in mind** – it is much easier to produce accessible content if you are mindful of this by design – and right from the start – rather than retrospectively trying to make content accessible.

- **Avoid symbol fonts or fancy text characters** (like this 𝑒𝑥𝑎𝑚𝑝𝑙𝑒). They are commonly found in people's profiles or in tweets but are scientific symbols that mimic unusual text and therefore are skipped by assistive technologies.

  So, as a rule, unless the platform you are using gives built-in options to change the font, avoid using or copying and pasting symbol or stylised fonts from other sites.

- **Use emojis sparingly.** Text-to-speech software reads all elements of a post – including emojis – so take this into account when using them.

- **Use 'Pascal Case' in hashtags.** This means capitalising the first letter of each word #JustLikeThis. In general, it is easier to read as you can see what the words are, but also assistive technologies, such as a a screen reader, will give the natural pauses between the words.

- **Add image descriptions.** Descriptive text is what text-to-speech or text-to-braille software will read to describe images on social media. It helps paint a mental picture of the image you posted. A short description is fine – you'll find some examples here.

- Most platforms will have an accessibility settings tab when posting, where you can enter your **alt text**. You can also simply type it at the end of your caption.

- Although platforms are getting better at generating alt text, captions and transcripts automatically, these can often be incorrect or incomplete so it's always worth checking.

- **Offer transcripts, subtitles or closed captions**
  Many in-app video editors allow you to add text to videos or download additional apps (search "closed captions" on Google Play store or Apple).

  Captions are essential for people who are deaf to be able to watch your videos. They're also helpful to people with learning disabilities and sensory processing disorders.

  As well as making your video content more accessible, it will also be engaging to those using their mobile with the sound turned off – (an estimated 80% of users!).

  It is also worth considering whether it is appropriate to provide transcripts in another language – for example Welsh if you are looking at reaching a school-based audience in Wales.

- **Think about infographics**
  Text in images (i.e infographics and graphs) can be difficult to read for some users. Ensure you include ALT text with a detailed explanation.

  If you are using images with text ensure there is sufficient contrast between the text and background.

Helpful Links

Challenging stereotypes

Drawing The Future

Education and Employers

bit.ly/drawing-the-future-report-published

Closing the STEM Gender Gap

See Jane

bit.ly/ClosingtheSTEMGenderGap

ASPIRES Research

UCL IOE

bit.ly/ASPIRESResearch-IOE-UCL

Inclusive language: words to us and avoid when writing about disability

Cabinet Office

bit.ly/GOVUKInclusiveLanguage

Inclusive language dictionary

Self-Defined

selfdefined.app/

Accessibility

Inclusive Design for Social Media: Tips for Creating Accessible Channels

Hootsuite

bit.ly/HootsuiteInclusiveDesignTips

Subtitle guidance

BBC

bbc.in/43wYHgH

How to make images accessible

Twitter

bit.ly/MakingImagesAccessible

Instagram Releases Auto-Captioning for IGTV in 16 Languages

LaterBlog –

later.com/blog/igtv-captions/

Promoting good physics

Wired

A media guide for physics

bit.ly/WIREDMediaGuideforPhysics

Quest

Social media guide

bit.ly/ImprovingScienceCommunication

Limit Less is the campaign to encourage and support young people to change the world and fulfil their potential by doing physics. It seeks to challenge the misconceptions and stereotypes about the subject and remove the barriers to young people doing physics beyond the age of 16.

Parents, carers and teachers: Please sign up as a Limit Less supporter to receive more information and updates on the campaign by visiting:

iop.org/LimitLess

Registered Charity no. 293851 (England & Wales) and SC040092 (Scotland). Updated July 2023.