

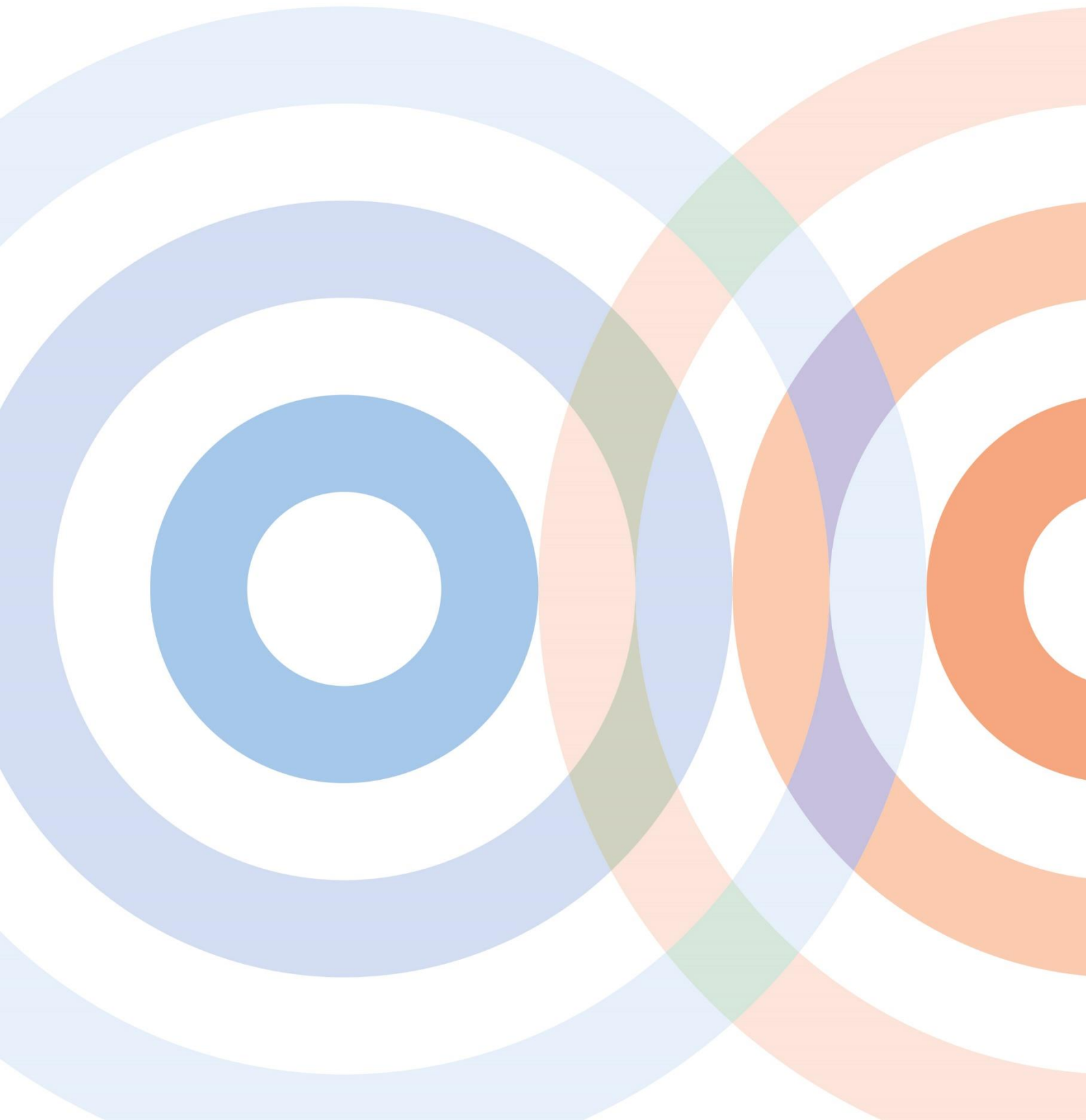


Ondata Research

Video Mentoring Evaluation Report

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October 2022



Introduction from the Physics Mentoring Project team

In 2020, the impact of the pandemic meant the Physics Mentoring Project had not found funding to continue its activities beyond August. To share the resources and learning from the project, Video Mentoring was conceptualised. Video Mentoring would create pre-prepared films and mentee-driven activities and make them available on the Physics Mentoring website. The project team received funding for the Video Mentoring project from The Waterloo Foundation to achieve this.

Video Mentoring aimed to support the PMP's aims of:

- Increasing take-up of A-level physics, particularly for girls.
- Highlighting careers and transferrable skills gained through physics study.
- Increasing engagement with science, self-awareness and confidence.
- Supporting physicists to develop their science communication experience.

The goals of the Video Mentoring project were to:

- Design, with the help of trained mentors, 5 mentoring videos with accompanying activities and resources which follow the weekly session themes.
- Create the above videos to a high-quality, in collaboration with a Welsh videographer.
- Give 5 mentors the opportunity to present a video each.
- Engage with 5 Welsh employers/industry partners through collaboration in videos.

Shortly after funding was awarded for the Video Mentoring project, the core Physics Mentoring Project was awarded two further years of funding, allowing it to continue. This meant the Video Mentoring project was no longer a legacy project, but one which would provide high-quality resources to deepen the impact of the core mentoring project. This was particularly fortunate at a time where the project was moving its provision online due to the pandemic and is discussed further in this report. These are summarised in the table below.

All videos were produced in collaboration with award-winning Welsh videographer, [Ffocws Media](#), and all resources and videos are bilingual or bilingual versions are available.

A webspace is under development as part of the project, which will provide a platform from which resources and videos can be downloaded and viewed. The Physics Mentoring Project plans to use the online webspace developed to provide training and resources for its participants.

Video	Weekly theme	Short description	Mentors/volunteers from industry
1 & 5	My Physics Journey & The World Around Me	This video is in two parts (and can be used as two separate videos): 1. Tiktok style “don’t rush challenge” showcasing mentors’ hobbies 2. Interviews with mentors to showcase journeys into physics	10 mentors in total from the following partnership institutions: 3 from Aberystwyth, 1 Bangor, 3 Cardiff, 2 Swansea, 1 University of South Wales
2	Thinking Like a Physicist	Mentor goes through their day with video pausing and explaining when certain skills are used in their day to day (e.g. scientific process, experimental skills, problem solving)	1 Swansea, 1 Cardiff mentor.
3	Where Physics can Take Me	People in a range of careers with different backgrounds in physics are interviewed about their jobs. Viewer guesses what they think they do.	6 volunteers from industry.
4	Collaboration, Teamwork and Communication video	POV-style video of Cardiff mentor who is studying their PhD at CUBRIC, collaborating with others.	3 Cardiff mentors.
Accompanying activities/resources: Viewers to find clues to move through an online escape room style game.			

From the perspective of the project team, whilst the Video Mentoring project emphasis changed, the overarching goals have been achieved and these high quality videos are still in use by mentors.

Rosie Mellors

Project Manager, 2019-Spring 2022



Introduction to the evaluation report

The Video Mentoring resources were evaluated as part of the wider programme of mentoring run by the Physics Mentoring Project. This report combines a number of sources of information to provide further insight into the impact of the videos. A description of the content of the films can be found in the Appendix on page 12. For a full discussion of the impact of the core mentoring programme in 2021-2022 please refer to the separate Annual Evaluation Report. However, in terms of the cycles of mentoring during which the videos were being developed and used (four, five and six) there was the following impact on mentees. Table 1 shows the change in attitudes towards Physics A-level following participation in the project for the most recent cycles (five and six) of mentoring in 2021 and 2022. Around three hundred mentees were reached (face to face or online) across cycles five and six.

	Pre-participation	Post-participation
I definitely will	4.3%	11.4%
I probably will	22.9%	20.0%
I am unsure at this stage	38.6%	30.0%
I probably won't	17.1%	18.6%
I definitely won't	5.7%	8.6%

Table 1. How likely are you to choose Physics at A-level?

Mentees have become more sure about their intentions and those stating they would definitely or probably take Physics A-level has increased by 4.2%. This is a significant achievement for the project, given the educational experiences of young people during the pandemic and the disruption experienced. A similar trend is found when it comes to interest in science careers, shown in Table 2.

	Pre-participation	Post-participation
I definitely will	22.9%	24.3%
I probably will	22.9%	28.6%
I am unsure at this stage	34.3%	17.1%
I probably won't	8.6%	12.9%
I definitely won't	0.0%	5.7%

Table 2. How likely are you to go into a science career?

There was an increase of 7.1% in those interested in a science-related career following participation in the mentoring programme. In order to provide some context for comparison, learners in the same schools were asked to complete the same surveys even when they did not take part in the mentoring programme. The non-mentored group saw a drop in interest in Physics A-level by 8.1% and science-related careers by 7.2%.

Methodology

A range of qualitative evaluation methods were used to capture mentor and mentee reactions after and in between sessions, with semi-structured interviews conducted with mentors after sessions had been completed. A summary of the methods used is provided in Table 3.

Method	Purpose
Mentee and Mentor reflections cycles four, five and six	Identify comments from mentors and mentees about the use of films and their impact
Mentor audit	Capture mentor thoughts on whether they used films and what they thought about them
Mentor interviews	Semi-structured interviews with a small subset of mentors to explore the role and potential of the films in more depth

Table 3: Methods used

The data was analysed using reflexive thematic analysis¹ and the following discussion section outlines the different themes arising.

¹ Braun, V., Clarke, V. (2019) Reflecting on reflexive thematic analysis, *Qualitative Research in Sport, Exercise and Health*. 11:4, 589-597

Mentor awareness of and perception of films

Mentors were introduced to the four new physics films (“My Physics Journey”, “Thinking Like a Physicist” “Where can Physics Take Me”, “Teamwork and Collaboration”) as part of their induction and training process. This included guidance on *“here's where you can find them, here's when you use them”* (Mentor interview).

The majority of mentors were aware of and were very positive about the films:

“Very good! we thought they were really useful and so did the students”

(Mentor audit).

The majority of mentors reported using the films with only two exceptions, with one mentor commenting that they did not use the films because they *“prioritised active engagement (ie. group activities) over passive engagement (ie. watching a video/ lecturing for too long)”* (Mentor audit). However, the same mentor did indicate the videos still had impact on them, saying, *“occasionally I do reuse some ideas from the videos.”* (Mentor audit).

There were no reports of mentors feeling that the films weren't useful, with one mentor commenting *“I can't think of any that we said, you know, 'no, I'm not using that one'.”* (Mentor audit).

Mentors used the films in different ways within sessions

There is evidence that mentors used the films in a variety of ways within their sessions. Some used the films as inspiration for planning their sessions (*“I thought they were neat, helped with session ideas and plans”*, Mentor audit). Some mentors chose to use the films as a foundation for a whole session, for example “Guess my career” was played throughout the session with pauses to ask for feedback from the mentors on what they thought.

Others used the videos as an engagement tool to make links to the mentees own experiences: *“It was like a bit of inspiration. So instead of just asking them, "how does football relate to physics" and them just saying "I don't know", at least having someone in the videos talking about how football did [relate to physics], and then they can then think "oh yeah, and basketball does too”.* (Mentor interview)

For one mentor, the films were a helpful tool for delivering sessions virtually:

“The careers video task was particularly useful for virtual mentoring as it allowed the students to work together and showed the range of jobs that use physics related skills.” (Mentor audit). Therefore the coincidental timing of the Video Mentoring project and the move to an online mentoring model due to the COVID-19 pandemic helped to ensure there were high quality resources mentors to use.

Mentors were also able to reflect on how they might use the films differently in future, including considerations for using films in virtual sessions: *“I think instead of asking the mentees to watch a video individually it may have been better for us to watch the video all together by sharing the screen”* (Mentor reflection).

They identified there was the opportunity for creating more mentor engagement by using the films amongst other delivery methods: *“we could pause it more frequently and talk about it and perhaps do activities in between each person and actually have a high level of interaction within the group rather than just the group watching the video”* (Mentor interview).

It is clear that regardless of the mentoring mode (online or in-person) there are opportunities to further develop their usage.

Impact on awareness of physics careers

One film had a particularly strong impact for both mentors and mentees. The “Where can Physics take me?” film was reported as particularly impactful with both mentors and mentees. Mentors commented on the importance of the film showcasing a broad range of careers: *“The where can physics take me video showing a range of careers that use physics always grabs the mentees attention! Highlights just how important physics is to everyone”* (Mentor audit). This film therefore helped to broaden mentee awareness of physics-related jobs.

Mentors commented that the breadth of jobs represented in the film was a very positive aspect, which had a strong impact with mentees *“it really showed the different areas that people pursue in terms of physics, and not just those who have a physics degree, but those who don't have it, but yet use physics”* (Mentor interview). The film also broadened mentee awareness of jobs they had not come across before (*“I learnt there is a job called ‘Client Manager’, Mentee Reflection*). The film content broadened mentee awareness of ‘who does Physics’

The range of interviewees represented in the film was positively received by mentors and mentees resulting in an increased mentee awareness of non-traditional or non-stereotypical career routes:

“I don't know how the team found these people...I could definitely see a lot of students being very surprised and actually, like, you know, a bit like, ‘wow’, like, ‘that's a thing [in that career]?” (Mentor interview).

Without the films being available, mentees would not have been able to see such broad examples of role models.

The film provided an opportunity for mentors and mentees to discuss the usefulness of physics beyond the classroom and also that studying physics could benefit them in the future, including opening up a broad range of career routes: *“I think that was nice for the mentees to see that you know, it's not just that straight line, there's a lot you could do with like a STEM subject like physics”* (Mentor interview).

Mentors commented that the video also provided opportunities for students to work collaboratively, which was particularly helpful in virtual sessions: *“The careers video task was particularly useful for virtual mentoring as it allowed the students to work together and showed the range of jobs that use physics related skills.”* (Mentor audit)

Mentees enjoyed the films and were able to make connections to their lives

All of the films were widely well-received by mentees across cycles four, five and six. Mentee reflections from cycle five included *“the educational vids”* (Mentee reflection cycle five) as the aspect mentees enjoyed or found most useful, (referring to the “My Physics Journey” film). Another mentee from the same session commented the aspect they found most useful was *“Their stories and how some mentors started learning about Physics”* (Mentee reflection cycle five). Mentees were also able to use the films to make connections with aspects of their own lives (*“I enjoyed how the physics that was talked about actually related to our hobbies”*, Mentee reflection cycle four).

Using films in general as a delivery mechanism was popular with both mentors and mentees

In addition to the films provided by Physics Mentoring, there was evidence that mentors also supplemented sessions with their own explanatory films:

- *“I enjoyed the demonstration videos, especially the vibrating plate one!”* Mentee reflection cycle four.
- *“I enjoyed the video about the high jump”*, Mentee reflection cycle six.
- *“I enjoyed watching the video about spinning”* Mentee reflection cycle six.

Suggesting mentors saw value in using films in general as a support to their mentoring sessions, and mentees were engaged with the method of delivery.

Being involved with the development of the films: benefits to mentors

The development of the films themselves provided opportunities for mentees to gain a deeper understanding of the project itself (*"it was helpful because I learned a bit about the project as well myself. I thought about it in a different way"*, Mentor interview), but also to develop their own interview and communication skills that they have used in projects following their involvement with physics mentoring.

"I've done stuff since...it's just sort of that on-the-spot interview thing. It just really does get you thinking", Mentor interview).

The experience also helped them to develop their confidence being filmed and interviewed:

"I think definitely confidence because.... you're just walking into a room of people you've never [met] before. And it was like a proper camera crew with like, the lights and stuff and the mic and all that." (Mentor interview).

Conclusion

Across the period for which the films have been in use, there has continued to be a positive impact on mentors in terms of their attitudes and intentions in relation to Physics A-level and physics-related careers. The films were perceived to be well-pitched, of a high quality and relevant to mentees as an audience. The films themselves were able to effectively showcase the range of skills needed to use physics in a range of roles and careers. The people featured were from a diverse range of careers and backgrounds, widening the types of role models available to the mentees. The films contributed to broadening mentee perceptions of who does physics, how physics related to their lives and how studying physics further could help them in their life and not just as an academic subject.

Mentors had a set of high-quality resources which they could use in a flexible manner within their sessions, whether they were engaging online or in-person. This flexibility allowed mentors to use them in different ways within their sessions, i.e. as a basis for a whole session, as inspiration, as part of a session. The mentors were also able to build their confidence in using films to engage mentees in sessions and for those who took part in the development of the films, they also improved their level of confidence being interviewed on camera. It also provided a high quality set of resources at a time when the project had made the shift to online delivery due to the COVID-19 pandemic, therefore increasing the originally intended impact for the project.

This project has supported the PMP in meeting project aims of increasing uptake of Physics A-level, sharing careers and skills information and developing science communication skills and confidence of mentors participating in the creation of the videos. The resources will continue to be used by mentors, ensuring a longer term legacy.

Appendix: Summary of each film

These notes were prepared by the evaluators based on viewing the films.

<p>My Physics Journey (9mins+)</p>	<p>Starts with a tiktok challenge showing young people in 2 frames: one in PMP tshirt with a prop and it then switches to them in different gear demo-ing their prop (based on their hobby).</p> <p>Each of the mentors then introduces themselves Cuts of each mentor sitting in a lab or office with a mug containing questions:</p> <ol style="list-style-type: none"> 1. Briefly describe your physics journey 2. Why I love physics... 3. Did you like Physics at school? 4. What skills has physics taught you? 5. Where is your favourite place to see physics? 6. Why are you a mentor?
<p>Thinking like a Physicist (4mins+)</p>	<p>Presents split screen of couple of people doing normal things (walking, locking up a bike), then transfers to people going into a lab/classroom: One side someone plays clarinet – ‘motor skills’, ‘creativity’, ‘contextualising’ One side students in a lab – ‘experimentation’, ‘analytical skills’, ‘data analysis’ Then changes to someone looking at a bike with a flat tyre – ‘observation’, ‘practical skills’ This is basically a ‘day in the life’ of a couple of physicists and everything they come across – how does physics relate</p>
<p>Where can Physics take me (19mins+)</p>	<p>Talking heads of people of different ages, genders, talking about their job, their favourite part etc. Ends with ‘what do you think I do for a job’ After all have talked about their jobs, there’s a reveal: Snr radiographer Head chef Lecturer Material Physics Client Manager Film Maker Science Communicator, author, rapper</p>
<p>Collaboration, Teamwork (2mins+)</p>	<p>Film taken from POV perspective of a PhD student, goes through regular day from getting in to office to sort of things they’d do each day, who they work with, goes into a hospital to use the MRI scanner, doing the scans, and the people they come into contact with along the way.</p>

About the authors

Ondata Research collaborates with clients to help them understand project impact, whilst also providing mentoring and support through the phases of project development and delivery.

Clare Meakin

Clare has worked in science engagement for national and local museums in London and across Scotland for the past 10 years. Working in both delivery and development, her museum-based projects have ranged from tinkering workshops for secondary students to science events for over 4,000 people. Most recently as Science Engagement Manager at National Museums Scotland, her work has focused on science engagement strategy development alongside evaluation of a wide range of funded STEM projects for funders such as Scottish Power Foundation, the Scottish Government and Children in Need. As a freelancer she has worked with regional museums such as Andrew Carnegie Birthplace museum on ASN and digital science engagement, and previously worked directly with primary schools for outreach, after school STEM clubs and teacher consultations.

Laura Thomas

Laura has extensive experience with a range of education projects across formal and informal education. In addition to evaluation she is experienced with project and resource development, delivery and training for a variety of organisations such as schools, science centres, museums, education charities, universities and professional bodies. She is undertaking PhD research relating to professional development of teachers after having completed an MRes in Educational Research with the University of Stirling.



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