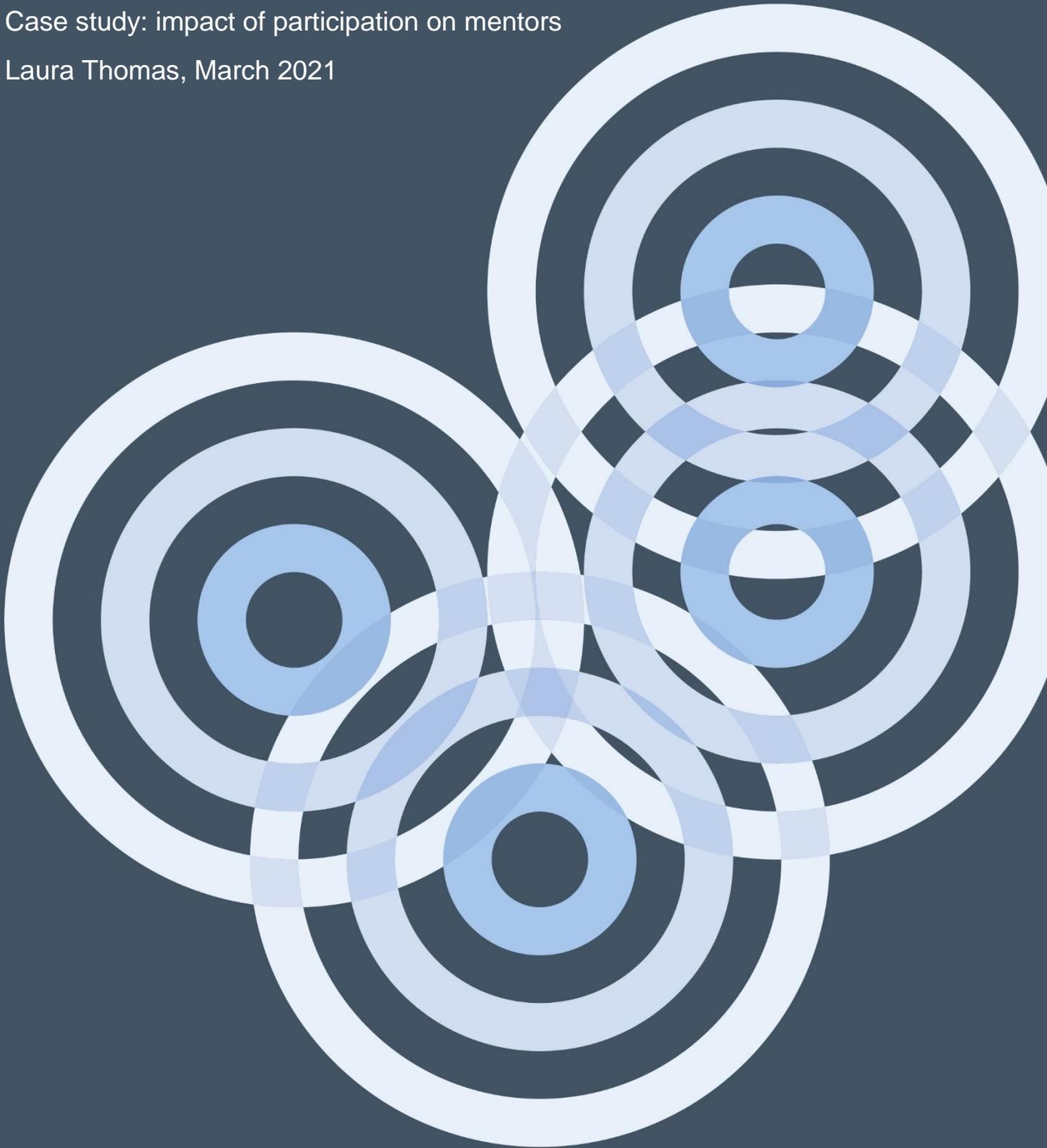


# Physics Mentoring Project Prosiect Mentora Ffiseg

Case study: impact of participation on mentors

Laura Thomas, March 2021



## *Introduction*

The Physics Mentoring Project has worked with schools across Wales since 2019 delivering a face-to-face six week mentoring programme. Groups of secondary school pupils are linked with STEM undergraduate and postgraduate students from Welsh universities with the aim of positively impacting on the uptake of Physics A-level and aspirations towards science careers, with a particular emphasis on increasing the proportion of female pupils. In Spring 2021 the delivery of the mentoring programme has moved online. Around fifty undergraduate and postgraduate students from universities undertook a comprehensive training programme to prepare them for working with pupils. This case study summarises the impact of participation on mentors. There are a range of benefits in relation to skills development, work experience and confidence in their own abilities.

## *Increasing the uptake of physics in Wales*

Out of the three science A-levels, physics has the lowest uptake at around 25%, whilst biology is at 40% and chemistry at 35% and this split has not shifted much in recent years (2017-2019)<sup>1</sup>. When examining the uptake of these subjects more closely, a higher proportion of females take biology compared with physics (60% versus 24%) with chemistry achieving a more even gender balance between male and female.

The Physics Mentoring Project began in 2019 to address these issues and its aims are linked to positively impacting the uptake of Physics A-level in Wales.

## *The Physics Mentoring Project*

The project is a collaboration between Aberystwyth University, Bangor University, Cardiff University, Swansea University and the University of South Wales. The project team is based in Cardiff University with the Project Co-ordinator leading the development and implementation of the project with support from colleagues within the School of Physics and Astronomy at Cardiff and in partner universities. The project team are key to the success of the project as they lead on development and delivery of training, relationship development with schools and support to mentors throughout training and the mentoring period.

Mentoring takes place in schools across Wales, including those in cities, towns and more rural areas. The mentors are STEM undergraduate and postgraduate students, with the requirement that they have taken Physics A-level or equivalent. Schools select the pupils who will become mentees. Those who are selected to take part have the potential to go on to

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<sup>1</sup> [Welsh examination results](#)

complete a Physics A-level but who are perhaps unsure as to whether they are going to choose it.

The Physics Mentoring Project currently has funding for the 2020-2021 and 2021-2022 academic years. The funding for this current round was confirmed in Autumn 2020, which resulted in challenges for the project team as they had originally expected the project to close. This meant contracted timescales for recruiting and training mentors, with training having to be re-written for online delivery, and there was ongoing uncertainty around the delivery model for the mentoring programme due to school closures. The project team have maintained a high quality of working during the COVID-19 pandemic when they were also adjusting to working at home and a changed way of life.

### *Impact on Mentors<sup>2</sup>*

Mentor recruitment generally takes place once per year with promotion via academic partners in all Welsh universities. Applicants come from a range of undergraduate and postgraduate programmes. The project has been very successful in recruiting mentors who felt the aims and ethos of the project really “*resonated*” with them.

A significant part of the experience of the project for mentors is the training programme. The sessions introduce them to the theory of Science Capital<sup>3</sup> which is the basis used for the project’s approach. This ensures that the experiences and interests of the mentees are valued and the mentors use these to personalise and link the sessions to what is familiar to the mentees. This content is supplemented by sessions on mentoring theory with other discussions relating to equity and inclusion. Mentors have the chance to observe model sessions and are supported in developing their own activities.

Participation in the training and mentoring supports the development of a variety of skills, including time management, communication and organisational skills. Mentors have also reported an improved confidence in their own abilities. They enjoy meeting students from other universities and collaborating with them. They also feel that being introduced to the theory of Science Capital will support any future science engagement work with one student this year being able to link their final year project to the theory.

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<sup>2</sup> Thomas, L. & Rushton, E.A.C. (2020). [Physics Mentoring Project/Prosiect Mentora Ffiseg Final Evaluation Report](#).

<sup>3</sup> Archer, L., Dawson, E., DeWitt, J., Seakins, A., & Wong, B. (2015). “Science capital”: A conceptual, methodological, and empirical argument for extending bourdieusian notions of capital beyond the arts. *Journal of Research in Science Teaching*, 52(7), 922-948

The quality of training is clear in the confidence the mentors have when going in to deliver their first sessions and the impressions the teachers have of them as being well-prepared and professional.

Some mentors are considering a teaching career and this direct experience with schools is valuable: *“Mentoring helped me understand a bit more about what teaching will be like and the work needed”*. For all mentors, taking part has provided valuable experience to include on their CV and talk about it in future applications and job interviews. *“I think mentoring will be helpful with getting me ready for the world of work, not just working with younger people”*.

#### *Impact on mentees<sup>4</sup>*

The mentoring sessions are designed and led by the mentors, with support provided by the project team. The impact the project has on schools is wide-ranging and not just linked to uptake of physics. Teachers feel that the project can *“increase the enjoyment and awareness of all the different aspects within physics”*. It provides the opportunity to work in small groups and can develop mentees’ skills, confidence and awareness in relation to physics and associated careers.

Following participation in mentoring there has been an increase in the numbers of mentees intending to take Physics A-level and in general, the mentees’ impressions of physics become more positive regardless of whether they go on to choose it. For schools there is the added benefit of a deepening of their relationship with a university and there are opportunities for teachers to have professional development.

#### *The Physics Mentoring Project in 2021*

The Physics Mentoring Project has continued to support schools in 2020-2021 despite mentors being unable to go into schools due to school closures and restrictions on visiting even when open. There major changes in the way the project operated this year was the move to online mentor training and the entirety of the mentoring programme is being delivered online.

The training for mentors was significantly changed in order to prepare them for working online with pupils. The model for online delivery sees a pair of mentors working together with a group of up to 12 mentees to deliver six sessions. Each session is themed but the mentors design the content to suit their mentees. Interaction between mentors and mentees is limited to the chat function of the online platform and via activities such as quizzes and polls. Sessions with

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<sup>4</sup> Thomas, L. & Rushton, E.A.C. (2020). [Physics Mentoring Project/Prosiect Mentora Ffiseg Final Evaluation Report](#).

mentors have been running for two or three weeks but the feedback so far from teachers and mentees has been very positive, with the sessions being fun and engaging. Mentors appreciate being able to work in pairs to deliver the sessions and are enjoying the experience.

University life has been a very different experience to what they would normally expect and this has had implications for the mentors' mental health. Mentors are all at different stages of study, with some in their first year of an undergraduate degree whilst others are completing their final year or embarking on a PhD. However, being part of the Physics Mentoring Project has made them feel less isolated as they are part of a wider community with a common purpose and amongst people they can relate to and they have built new friendships as a result.

The project team and colleagues from Creo Skills involved in the training focussed on developing a supportive community, which one mentor described as a safe, friendly and inclusive environment. Those delivering the training successfully modelled the behaviour and practices they wanted the mentors to take forward into their own online sessions with mentees.

In terms of balance with their university work, some mentors felt that the training commitment was perhaps more than they had anticipated but that they were able to balance it alongside university classes and assignments. It was particularly helpful that the training sessions were run multiple times, allowing students to choose the ones most suitable for them. As a result of the training, mentors felt confident going on to develop and deliver their first sessions. Additional benefits to the training are that mentors are perhaps more prepared than their classmates when it comes to presenting online and some feel this will give them more confidence when participating in online group work or assignments requiring a presentation.

### *Conclusion*

This extra-curricular programme is crucial in providing an opportunity for students to develop skills and gain a positive work experience resulting in improved employability and clearly adds to their university experience more generally.

The added benefit to participation in 2020-2021 is that mentors are part of a like-minded community meaning that as they experience online university teaching, they feel less isolated.



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