TRAINING IN OPEN SCIENCE FOR PHD STUDENTS: THE STUDENTS' PERSPECTIVE

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Abstract

Studies in recent years from around the world have shown that between 15 to 50% of PhD graduates go on to work in Higher Education (depending on the cohort studied and how "work" is defined). These figures have led to the "PhD crisis discourse" (Cuthbert & Molla, 2015). A key feature of the PhD crisis discourse is that universities are producing too many PhD graduates compared to the number of academic jobs available, and that graduates lack skills that render them employable in jobs outside academia. Thus PhD education has been moving towards a pro-skills development agenda, with a particular focus on transferrable skills. This poster presents work undertaken as part of an EU funded project – "Opening Doors". The goal of this project is to shape more innovative, socially aware and integrative research graduates, ready to meet the challenges of the future through a training module in Open Science - the design of which was informed through stakeholder interviews and a co-design workshop. This was a for-credit, online, interdisciplinary, intersectoral and international learning experience that consisted of challenge-based learning with external organisations, lectures and activities about open science and open innovation, and included facilitated work on career planning. Course participants were invited to take part in entry and exit interviews and submitted a written reflection at the end of the course. Their perspectives on this training are presented here where issues around career prospects, communication in collaboration and a new undertsanding of impact were to the fore.

Keywords: (Open Science, PhD Education; Research Impact)

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1. Introduction

The "OPENING DOORS"[1] project funded by the European Commission under the "Science with and for Society (SWAFS) mechanism in Horizon 2020, developed a 10 ECTS, open, online challenge-based educational course in Open Science and Open Innovation for international PhD graduates and post-doctoral researchers, entitled: "Opening Your Research to Collaborative Futures". Its ultimate goal was to shape more engaged, innovative, socially aware, entrepreneurial and employable doctoral and post-doctoral researchers, prepared to meet the challenges of the future. The learning objectives of this course were as follows:

1. Build awareness of, and practice using open innovation frameworks and tools to facilitate co-creation and innovative thinking with stakeholders to increase the societal value of research.
2. Build awareness of, and practice using a selection of open science tools and approaches including ethical considerations such as research integrity and data management.
3. Design and implement collaborative projects with other researchers (from different sectors, disciplines and geographies), with other industry or community groups, understanding the importance of process as well as outcomes.
4. Communicate and open research up to a variety of international stakeholders including researchers from other disciplines, community organisations, governments, businesses, and civil society.

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[1] Opportunities and Education in Networked Innovation for New Graduates with PhDs using Open Online Resources

5. Articulate and explain knowledge, worldview, methodologies and research goals and be able to respectfully engage on these topics across sectoral and disciplinary boundaries.
6. Create a plan for professional development and the development of a professional network to support traditional and/or non-traditional career paths that align to student values, talents and interests.

Students undertook short-term intersectoral projects with external organisations as a challenge-based learning" experience. A personalised instructional design was integrated with the flipped classroom (Hung et al., 2019) and student motivational learning spaces (social interaction/networking) (Zhu, 2022). This course can now be accessed as an open educational resource at https://open-tdm.au.dk/blogs/openingdoors/.

2. Research Design

Over 60 PhD students signed-up to the course who were registered to doctoral programmes in EU countries Ireland and Denmark in the Spring Trimester 2022. Over half of the students registered attended most of the course sessions and submitted coursework for academic credit, while others attended only certain sessions that they felt were relevant to them. Thirteen participants gave their consent to participate in a semi-structured online exit interview over Zoom once the course was completed. They were invited to discuss a) their perceptions of the course as a learning experience and b) their reflections on the course as a career development activity/practice. These interviews were transcribed and the transcripts were coded according to Braun & Clarke's (2006) framework for thematic analysis. Ethical approval for this study was granted by University College Dublin's Ethics Board.

3. Results

This poster presents preliminary themes following a semantic thematic analysis of the transcripts. Four themes were created as follows:

1. **Course participants valued the opportunity to collaborate on a "real-world" interdisciplinary project where they were challenged to apply their skills in a new way. This juxtaposes a PhD experience that can sometimes feel isolating.**
The opportunity to work in teams with an external organisation to help address an authentic challenge within that organisation was considered by the students to be a "novel" learning experience and a "privilege". Students cited "working and dealing with people from diverse backgrounds and cultures" as being an "excellent opportunity", and one that they sought to extend to their PhD experience outside of the Opening Doors course:
> "I became very much aware that other fields can contribute to my very specialized field. And I started asking outside my field for feedback. And…I invited some people just doing lunch with me to talk about the project, from their point of view, without being specialists".

Students also grew in confidence in their ability to apply their skills to problems that were unrelated to their research field:
> "I have no background in transportation, neither marketing. But then I was in the Smart Mobility group. ...that was way outside of my comfort zone. So it was important to just really know, firstly, that you are capable of doing anything, and then knowing that there is, you know, a network of people who, once you decide on the way [to do] particular tasks, working as a team, you can achieve a targeted goal".

This collaborative experience was a change from many students' solitary PhD experiences:
> "I met really, really wonderful people, and not being a part of any network during the PhD, working alone… it was kind of like a change, a good change from that. And meeting people from different countries and from different universities, in different working styles within academia.

2. **Career development exercises undertaken in the course opened new perspectives for participants on their future careers in relation to careers outside academia, though an academic career remained a prominent goal.**
Students explained how the course prompted them to make new connections outside of academia as part of their career development efforts:
> "[I should] not only look at developing into academia, because it's so competitive… I sent in an internship CV, as one of the activities and they said, Well, we actually have a position .. for

a year contract. Well, here's a good opportunity to have a career…but I may not be able to continue the PhD. So that really created a conflict in one way. But it also opened up my eyes to other opportunities. I think that was really important".

Networking within the course also opened some opportunities for students:

"In my group that there was this one participant, and he is working for a company that I'm very interested in. So that was an opportunity during the course, to network with him. And I've been invited to some meetings at his workplace, in this networking with him and he's introducing me to a lot of people".

3. Communication training the students received was readily applicable in their lives and should be integral to PhD curricula

Communication training on the course included how to pitch their PhD in 3 minutes to a non - specialist audience; how to collaborate in a team through effective listening and empathy, among other things. Students were able to apply these skills directly following the course in important ways:

"I found that really, really helpful … just trying to focus down on exactly how to explain [in 3 minutes] what I was doing to people that aren't in optometry. So that was really helpful".

"There was one guest lecture who said, "if you don't know anything, stop someone, ask, because the other person will not know what you are going through. Or what it is you're not able to understand". So I recently used that in my one of the areas. I felt that was very good".

"And the section on conflict resolution, I've used as well. That's great".

4. Course participants developed a deep understanding of principles that underpinned open science that went beyond technical knowledge of tools

As well as exploring the use of open science tools and frameworks, students demonstrated the capacity to reflect more deeply on substantial matters:

"What interested me about open science when I heard it initially, you know, of course, one wants to share your article and your work. But the data, I had not thought about that. And guess what, if you're sharing data, it has to be very well collected, and it has to be very good quality. And I would put in a higher level… you'd be paying more attention to it than if you're just gathering it yourself. You lock it in a box. But if you're opening your data, then that is a real protection against bad practice creeping in, because it can't be there for everybody to see.

"Open access to research, open collaboration, like open innovation, this will also benefit areas …beyond Europe. This is also benefiting others, especially, I would say, underprivileged, developing countries, etc. Because I'm sure they would benefit a lot more from these [open research] outputs, even through participation in collaboration in this kind of a programme. But this is something which can be looked into if the resources permit".

5. Conclusion

This preliminary analysis suggests that PhD students reported a positive learning and relational experience on the "Opening Your Research to Collaborative Futures" course, particularly based around working with external organisations and students from diverse disciplines and cultures. Students integrated diverse learnings towards concrete actions for their professional development.

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