

## **Title:** Creating a Home for Interdisciplinary Research Students - A Case Study

### **Abstract**

The benefits of interdisciplinary research and collaboration are widely accepted, but how we support PhD students to develop as truly interdisciplinary researchers is still open to debate and experiment.

Here we present our Centre for Doctoral Training (CDT) - OPTIMA, our students and the evidence of their lived experience of working across institutional and disciplinary boundaries. Moreover, we present how this impacts on their sense of belonging, community and identity.

OPTIMA, the EPSRC and MRC CDT in Optical Medical Imaging, aims to train the next generation of healthcare entrepreneurs. Our CDT is hosted by the Universities of Edinburgh and Strathclyde and recruits 12 PhD students a year from a broad range of disciplines.

Anecdotal evidence suggests that students identify as "OPTIMA students" We aim to reflect on this identity and evaluate our programme through our students' perspectives. These were gathered through focus groups and semi-structured interviews and the data analysis reveals aspects of the student experience such as their perception of community, identity, belonging and voice.

This paper establishes areas of good practice that can enhance some aspects of the student journey and the objective is to disseminate the results into the wider academic community.

### **Introduction - background**

There is increasing pressure to tackle key "real world" problems with interdisciplinary research. In the UK, the research councils are working ever more closely together (for example in the new context of UKRI), and at any one time, more than 50% of Research Council grant portfolios are interdisciplinary. (1) However, training new researchers with an interdisciplinary mindset is not without problems: e.g. there are difficulties concerning the lack of a disciplinary "home" (2), and students can feel academically isolated and cast adrift. One potential solution is the creation of interdisciplinary communities of practice in the shape of cohort-based doctoral training programmes (3). These types of PhD programmes have been around for some time and in various fields. Here, we address the issue of support for interdisciplinary researchers through the creation of a community of practice of PhD students via the Centre for Doctoral Training (CDT) model and ask "*What can these cohort-based training programmes do in practice to support these researchers? Is the community of practice enough to give the sense of "home" sometimes lacking for interdisciplinary research students?*" In this case, we discuss this sense of home by probing the students' perspective of their own disciplinary and research home, as well as the sense of community, identity and voice they perceive they have as OPTIMA students.

### **Introduction to our case study**

In 2014 a new swathe of Centres for Doctoral Training was funded by the Engineering and Physical Science Research Council. These centres were to:

*"... bring together diverse areas of expertise to equip engineers and scientists with the skills, knowledge and confidence to tackle current and future challenges....Each Centre trains doctoral students for four years, including technical and transferrable skills training, as well as a research element. They provide a supportive and exciting environment for students, creating new working cultures, building relationships between teams in universities and forging lasting links with industry."* [www.epsrc.ac.uk/newsevents/pubs/cdtprosperousnation/](http://www.epsrc.ac.uk/newsevents/pubs/cdtprosperousnation/))

This mission statement from EPSRC not only recognises the need to train our doctoral students in their research practice but adds extra dimensions that involve aspects of identity, community and voice.

Our response to this call was to set up our EPSRC and MRC (Medical Research Council) Centre for Doctoral Training in Optical Medical Imaging, known informally as OPTIMA.

Our Centre aims to address some of the challenges as set out in the EPSRC statement above.

We gathered 40 academics and clinicians across the physical sciences and biomedical sciences to tackle training in the theme of optical medical imaging. In order to address the requirement for interdisciplinarity, we set up a procedure whereby each PhD project was required to be supervised by at least two supervisors – one from the physical sciences (physics, chemistry) or engineering and another from the biomedical sciences. To complement the interdisciplinary nature of the research projects, we wanted to recruit students from a variety of backgrounds to address this theme - we currently have 45 students from disciplines spanning a diverse range, from veterinary medicine to electronic engineering.

In addition to the scientific interdisciplinarity inherent in their research, our students had another level of disciplinary-challenge to address. OPTIMA identified a gap in doctoral training – namely students' lack of in-depth knowledge of the challenges surrounding the translation of research into real-world innovations and patient benefit. This led us to create an integrated study programme in conjunction with the University of Edinburgh Business School and the Hunter Centre for Entrepreneurship at the University of Strathclyde.

The curriculum comprises 180 credits of SCQF11 courses forming a bespoke programme of study in healthcare innovation and entrepreneurship. Our students are essentially enrolled in a Business MSc programme which is delivered across their four years of study and not only encounter new pedagogical styles and epistemology, but work with students from a wide variety of backgrounds.

An additional element to OPTIMA is geography. We are hosted by the Universities of Edinburgh and Strathclyde and numerous research centres and schools are involved. In practice, this means our students are spread across Edinburgh's campuses from Little France in the south to the Western General Hospital in the north of the city as well as between Edinburgh and Glasgow. Although the students have an OPTIMA office or hub in the Little France campus in Edinburgh and the Technology Innovation Centre in Strathclyde, their research often involves being in locations physically separate from these hubs.

Bearing in mind these various disciplinary and geographical challenges, one of the six key aims of OPTIMA is also to: "Get the doctoral students into a powerful, confident and cohesive 'family' able to evolve and grow the CDT." This means putting in place structures and processes that allow these students from different backgrounds to have an identity, a community and an active voice in the management and running of OPTIMA.

We have done this in a number of ways:

#### Community / Identity:

- An induction at the beginning of each academic year introduces the new cohort to each other through a series of seminars and activities, and introduces new students to existing students.
- All OPTIMA students can have a desk at one of two hubs – one in Edinburgh and one in Glasgow.

- The integrated study programme spans the four years of the PhD programme thus allowing students to come back together at least once a semester to work in groups on business projects.
- An annual summer school brings together first and second years to share their projects through talks and posters, and provides the opportunity to pilot new training activities.
- An annual OPTIMA showcase allows the third years returning from placement to share their experiences with the other cohorts and impart some of their learning
- OPTIMA Updates sessions, where students meet once a month to share their experiences in their research projects, enable group-thinking and peer-to-peer learning and offer both material and pastoral support.

Voice:

- Each cohort has a representative that sits on the OPTIMA steering group with the management team.
- Every year, at the summer school, we have a feedback session and ask for new ways to improve the courses, many of which have been implemented.
- We ask students to meet with our advisory board (without the rest of the management team present), so they can feedback their experiences to the board who then advises us.
- The OPTIMA manager sits in the same hub office as the students to ensure ease of access to management and informal translation of new ideas.

In the past three and half years we have some evidence that these efforts are engendering a sense of OPTIMA community and voice through various mechanisms:

- Many examples of peer-to-peer learning within cohorts and between cohorts, e.g. students with programming experience helping students from chemistry/biology backgrounds with MATLAB coding.
- Students worked together to organise and run a student conference that had over 100 delegates from CDTs around the UK.
- Business courses have been extensively amended both in the structure of individual courses and in the elective courses available in response to student feedback, this has resulted in improved feedback year-on-year.

However, in addition to this evidence, we also wanted to look at the student experience to ascertain their perspectives and their sense of community and identity. Specifically, in light of existing research (2) we wanted to explore the issue of “home” as perceived by interdisciplinary researchers.

## **Approach**

To do this, we initiated a research project: “Creating a home for Interdisciplinary Research Students” We prepared a research information sheet and received ethics approval to conduct this research.

The research questions that drove the group interview were as follows:

- What does it mean to be an interdisciplinary student? Where do students feel most “at home” and how does that relate to their initial discipline and/or the influence of their new group/supervisor?
- Is there such a thing as an OPTIMA identity and what does that mean?
- Do students feel they have a voice within and beyond OPTIMA?

- What communities do students belong to, and how do they compare to each other?

All OPTIMA students were invited to take part, and our findings were based on a group interview with 6 OPTIMA students who volunteered to take part. These students were a mix of male and female, and there were students from each of the four cohorts currently undertaking the OPTIMA programme.

The leader of this session (ND) is a PhD student from the School of Social and Political Science and thus not a member of the OPTIMA management team. The students' responses were anonymised for the OPTIMA team.

## **Results**

Some of the themes that emerged from the group interview were as follows:

The interdisciplinary nature of each PhD project dictates that each student will potentially have up to 3 supervisors from different academic disciplines. Students feel they have regular contact with their principal supervisors, giving them a sense of belonging in a discipline, however, contact is more sporadic with their other supervisors.

They feel responsible for their own project, and some talk of lower input from their supervisors compared to other PhD students. Others describe how their project focus changes much more than in traditional PhD projects.

Their description of being an interdisciplinary student has both positive and negative aspects. While they enjoy the freedom and variety and feel like it offers them a sense of increased confidence and self-awareness, they can also feel somewhat adrift: "I don't know where I fit in the field" and conspicuous "feel like an oddball initially".

For OPTIMA students who already had a professional identity, their interdisciplinary experience in their research project has not changed this identity. For those students who entered the programme from undergraduate degrees – many feel like they belong to their original discipline. Others are unclear about their disciplinary identity but suggest they wouldn't like to do a traditional PhD programme and enjoy the variety and being different.

The students describe their OPTIMA identity through their feeling of being "different" from other PhD students. OPTIMA students travel between research groups, engage in taught courses and have different commitments to their peers and this forms a visible difference for them. Students did say it is how they "explain" why they were away from the lab to their peers. Our students use the concept of OPTIMA identity to explain why they are regularly away from the lab, when other students enquire, maybe as a justification for their absence, or to highlight aspects of their programme which are different from other students'.

OPTIMA as an identity is also described as a "safety net", a "key resource" or the "management team". Students spoke of seeking help from OPTIMA if things go wrong. This experience, which leads into the concept of community, seems to suggest that OPTIMA is not just a community of students, but also a student-staff community with valued support for students.

Students find that the OPTIMA community was much more evident at the beginning of their studies, but as time progressed, this feeling of community has waned as the demands of their research means spending more time in the range of diverse locations of the laboratory groups. However, they do feel that the integrated study programme (which is spread over the four years of their PhD) allowed them to re-engage with their cohort.

The students also describe their OPTIMA peers as a 'ready-made' network that they can tap into which meant that they "feel I can talk to everybody".

In terms of voice, students feel that there had been much more input to the operation and structure of the programme by the first cohort of students and that subsequent cohorts do not have the same feeling of empowerment in shaping the programme. Also because their identities vary when belonging to different lab groups *etc.* they are sometimes uncertain about who they need to turn to express their voice.

## **Discussion**

In gathering our students into a group interview, we have gained a novel perspective on some of the aspects of both cohort-based training and interdisciplinary training

By listening to these students' perspectives we have come to some new conclusions on the student experience in this cohort-based training programme.

Setting up a truly interdisciplinary experience for PhD students is not without difficulty. Steps that are taken to ensure novelty of research and develop new multidisciplinary collaborations can be destabilising for students, if only by comparison to the traditional model. By ensuring we are developing new collaborations across disciplinary boundaries – we are also encouraging our supervisors to step outside some of their usual research fields and into new areas. This affects students' sense of identity and empowerment. For some students it is empowering to drive their research direction earlier, while this can feel isolating to others. OPTIMA projects are perceived to be more mutable over time than other PhD projects – and given the nature of these new collaborations – this perhaps should not be surprising. One can imagine though that for some this is disconcerting, especially when students compare themselves to the more traditional "apprenticeship" model of the PhD where there is a given lore or dogma in the group about how PhDs proceed down a particular path for a particular supervisor.

This work has highlighted that the processes and procedures for setting up new collaborations that lead to the PhD projects could be looked at to improve cross-talk between disciplinary groups beforehand, and in the early stages of the PhD project. This would not only enhance the student experience, but could also iron out any initial difficulties between new collaborators. OPTIMA will explore implementing a joint session for supervisors and students where the new team (multidisciplinary PIs and OPTIMA students) are brought together in a workshop setting. The workshop would explore the nature of the research, set out ground-rules and/or dispel myths, similar to a model described by Girard *et al* (4).

It is worth mentioning though that despite the element of difference as described above – the comments regarding community and identity suggest that while students may have struggled with the concept– many of the remarks and quotes from this session are telling as direct evidence of an OPTIMA community. Students describe OPTIMA as a network and a resource, and a safety net. Their comments suggest that OPTIMA as both a staffed resource and a student community has meaning for them and can give them the support they need to navigate their PhD journey.

As the OPTIMA student population has grown and the centre has become more established, it is clear that the students feel like they have less of a voice than in the early stages. This is perhaps not unexpected as the initial 'pilot' phase of a programme required a large amount of interaction with the first cohort of students to address issues that are subsequently "fixed". It can also be attributed to the growing number of students from the initial 9 students, now to a group of almost 50. One way we can address this is by more efficient and publicised use of

student representation. By engaging with student associations in Edinburgh and Strathclyde Universities we can be more proactive in providing training for reps. Training reps allows them to understand their roles and responsibilities and the benefits of the position to themselves and their peers through their contributions and regular dialogue with the management team.

## Conclusion

The use of a group interview with students was a crucial and valuable exercise to surface aspects of student experience unexplored by the OPTIMA team.

It has provided us with evidence that measures put in place to “gel the cohort” have been successful – particularly with respect to a sense of OPTIMA community. It has also highlighted some areas (e.g. interdisciplinary interactions, voice) that we can work on to enhance our students’ experience.

We have learned more about the student journey than by, for example, surveys, and we will use this model again to address other aspects of the OPTIMA experience both for students and PIs.

## References

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