5

Collaboration with Stakeholders

Introduction

The cooperative, humane university works against the tradition of the individualistic, competitive one (Barnett, 2004) and thus requires methods and methodologies that make space for the whole person – student and staff member: a collective 'third space' (Bhabha, 2012; Burns et al., 2019; Gutierrez, 2008) where, by 'being with' (Nancy, 2000), individuals start to come together and 'become' together. Or, as Soja (1996) said, a space that allows for collaborative praxes and habits enabling the formation of Communities of Practice (Lave & Wenger, 1991), that sustain, provoke, challenge, extend and support. Communities that encourage reflection, innovation and change – crucial capacities in addressing real-world issues. Issues which include addressing the barriers to collaboration: time and financial poverty, precarious contracts, lack of self-efficacy and/or institutional support.

In this section of *Collaboration in Higher Education*, we provide case studies where societal and academic culture come and work together for 'real' change. We uncover the ways in which habits of being and working together help those stakeholders inside and outside the university to embrace the uncertainty (Sinfield et al., 2019) of the precarious and often hostile practices of a neoliberal world and a marketized academia, and sustain our academic identities and our praxes in creative ways (Robinson, 2006).

The case studies focus on those partnerships that develop alongside the university where schools, external partners and other higher education institutions come together to meet real needs, and foster student learning and success. The authors demonstrate that in each case, the very collaborative processes in and with which they engaged, helped academics and students, communities and individuals, the public and private sectors, allies and opponents, work more powerfully together to achieve common goals. A key to success was for partners to find their way 'into' the idea and work together to share experience, practices and resources whilst working together to shift strategy (Huxham, 1996), often developing their approach to what 'counts' as academic practice as a result.

The Case Study Chapters

Tutors, Students, and Other Stakeholders at the Roundtable by Gabriella Rodolico, Deborah Simpson and Geoff Barret outlines how a multi-stakeholder project designed to increase appreciation of the nature of STEM created commitment, energy and

community. A unique collaboration between university and schools created an engaging engineering project for primary and secondary pupils, their parents and staff. The 'working-together' approach enabled professional dialogue and development between and among STEM practitioners (technicians and academics), student teachers and the wider school community.

In *Healthcare Scientist Education,* Carol Ainley demonstrates how universities can collaborate to produce an excellent student experience. The chapter looks at how three universities came together to overcome traditional barriers to collaboration, working together to deliver science education to healthcare professionals for the benefit of both the students and the institutions. Ongoing, open dialogue where all partners have an equal voice has been key to this project's success.

Multi-partner Doctoral Training Collaborations by Donna Palmer, Rachel Van Krimpen and Susanna Ison discusses four types of collaboration which the authors have identified as underpinning the successful delivery of their collaborative, cross-institutional doctoral training programmes. The chapter highlights the innovative approaches they employed to initiate and maintain working partnerships between academic and non-academic stakeholders and the ways that they have shared knowledge, expertise, resources and facilities across their consortium to the benefit of students, lecturers and institutions alike.

Tutors, Students and Other Stakeholders at the Roundtable: A Matter of Equal Partnership

Gabriella Rodolico, Deborah Simpson and Geoff Barrett

- The development of STEM capacity in in-service and pre-service teachers can be achieved by collaborative projects that happen in the real world of the school.
- Academic and non-academic experts should be actively involved in collaborative processes with in-service and pre-service teachers and Initial Teacher Education tutors and other stakeholders to devise and develop innovative community projects to facilitate authentic learning.
- Community-based learning projects create practice where knowledge and experience can be exchanged in an ethos of equity and mutual enrichment.
- Multi-stakeholder projects model that teaching is best not as traditional 'pedagogy', but as the dialogic facilitation of communal learning.
- HE tutors should foster equal partnership with their students by actively involving them in their own learning, modelling a life-long professional development mindset.

Introduction

STEM education is considered an integral part of our future economic and social development (Scottish Government, 2017; Sharma & Yarlagadda, 2018); however, teachers entering the primary profession tend not to enter teacher education courses with a specific science background. Research shows that teachers are concerned about several barriers to their successful delivery of STEM subjects, such as lack of subject knowledge (Jones et al., 2021), pedagogical challenges of teaching science and lack of teacher support. Arguably, this could be overcome by promoting collaboration with peers as part of effective professional development (Margot & Kettler, 2019).

It is also plausible to think that a focus on the nature of STEM as a whole, rather than individual STEM subjects (Kelley & Knowles, 2016), will enable Initial Teacher Education (ITE) institutions to promote professional dialogue between and among STEM practitioners (technicians and academics) and student teachers – creating an equal partnership where the sharing of knowledge, as well as of learning and teaching experiences, could generate professional development opportunities and enhance student teachers' self-efficacy with respect to STEM delivery (Healey et al., 2016). It has been recommended that educators work together with industries and schools (Veenstra, 2014) to create hands-on activities which could enhance fundamental STEM skills (Ejiwale, 2013).

Building on this premise, in early 2020, Gabriella Rodolico, lecturer in Science Education at the School of Education, University of Glasgow, and one of the authors of this case study, resolved to address this issue via a new collegiate STEM project aimed to develop a more collaborative approach to STEM learning. Gabriella initiated the programme with a series of professional conversations across a team made up of academic and non-academic professionals (engineering and mathematics), Post Graduate Diploma in Education (PGDE) primary-teacher students and co-authors, Geoff and Deborah, and in-service teachers in mainstream and Additional Support for Needs (ASN) schools.

The team worked together to produce a hands-on remotely delivered STEM Challenge: *Build Your Own Sustainable House*. This project was undertaken by schools, teachers, parents/guardians and pupils to achieve the common goal of learning for Sustainability. Four schools engaged in the STEM challenge, supporting the theoretical aspects and the practical model building, through a series of lessons. These were managed at schools by the in-service and probationer teachers who engaged with pupils, and at home by Gabriella and the Project Engineer Lorna Bennet from the Sustainable Energy (ORE) Catapult who delivered a series of twilight sessions engaging pupils and parents/guardians.

The project's outcomes went far beyond expectations. In this short case study, we, the authors, reflect on the project's outcomes, its collaborative workings as well as the overwhelmingly positive participant feedback. Finally, we present recommendations on how better success in STEM education could be achieved when ideas are exchanged in an active collaborative process between Home-School-University and other stakeholders with pupils in the middle.

Ways of Working: Launching and Reflecting on the Collaborative Project

Recent studies highlight the benefits of Home-School collaboration in both primary and secondary schools. They underline how the interaction between parents and teachers, beyond parents' nights and homework, could promote pupils' autonomy and empower the students' agency (Vedeler, 2021). Our STEM project took a triangulated approach, bringing together Home-School-University – with the University element drawing on the benefits of HE outreach activities. Reimers and Marmolejo (2022) have demonstrated such outreach to be very effective in supporting schools through the production of learning resources and technical support (Lazareva, 2021). The project incorporated third-sector engineering expertise to produce a final hands-on resource to support teachers in developing a deeper understanding of the nature of STEM, and enhance the STEM literacy of their learners, for example, by understanding the engineering design process with a 'to engineering' mindset (MacLeod, 2017), that is, the ability to identify complex problems and generate elaborate practical solutions that meet human needs (Faikhamta, 2020).

As with all engineering projects the process involved collaborative experimentation and prototype development, initiated by an initial STEM challenge: *Build a Floating Turbine* which was jointly developed with the student teachers into the *Build Your Own House* and subsequently *Build Your Own Sustainable House*. The STEM challenge was to be delivered to a total of four schools: one Additional Support Needs (ASN) secondary school and three mainstream primary schools – following an initial pilot in one of the mainstream primary schools in the project.

The pilot was led by in-service teachers where further reflections would refine the delivery plan and extend the project to the ASN school and finally to the last two mainstream primary schools led by Geoff and Deborah. The idea was to build a step-by-step reflective process with progressive and professional conversations between expert and novice teachers as well as University tutors and other stakeholders. This included parents' and pupils' feedback in a scaffolded teacher learning community fashion (Gutierez, 2019). Based on this ethos of equal collaboration, in-service and probationary teachers became active authors of the project, driving those changes that only their professional judgement could suggest (Donaldson, 2014).

Evaluative Collaborator Voices: In-service Teachers

Feedback and teachers' reflections gathered through reflective journals, Zoom chats, Twitter and emails were very positive. In-service teachers from the pilot mainstream primary school commented:

> [This project] has allowed opportunities for learners to brainstorm and discuss in class and in groups the need to use renewable energy and prioritise sustainable building/ houses. […] This project was also successful in raising teachers' and pupils' awareness of the social science.

Teachers also reflected on the importance for pupils to engage with 'a variety of careers related to the social sciences, including research' and to be 'fully engaged' in collaborative learning strategies. Even more importantly, pupils also raised their awareness that women can be very successful in STEM – with Dr Rodolico and Miss Lorna Bennett as positive role models. Feedback also highlighted an unexpected long-term impact of the project as teachers planned:

> … to incorporate elements of this project into our planning for our primary Year 7 classes next year. The learning covered so far has been a valuable introduction that we can now extend.

Parents and pupils' feedback highlighted how enjoyable it was to work collaboratively to build the house and discuss the great variety of topics that this project covered. It also fostered their awareness of STEM and STEM careers: 'I know that STEM careers are critical. Glad to be able to share these tasks with my daughter.'

To facilitate inclusion, sessions were also recorded and offered in a flexible manner and some parents said,

> While I couldn't participate in the live sessions due to work commitments, I think there was a lot of value and learning gained by both my daughter and I and gave us some great quality time together while discussing some real-world issues in a child friendly way.

Teachers at the ASN schools concluded:

> Everyone had the opportunity to achieve. Without doubt, the best 'evaluation' came from the pupil who left school that night with a 'carry-out' pack of equipment curious to develop and extend his learning.

Evaluative Collaborator Voices: Geoff and Deborah's Reflections

The collaborative approach of the project was vital to its success, as Geoff and Deborah reflected:

> Without clear and open communication between teachers, tutors and parents/ guardians, the project would surely have floundered.
>
> By reflecting on the pilot session and the outcomes from the ASN school, it became clear to us, that some of the material needed further development to be tailored around the needs of our pupils. For example, at my primary school I had younger pupils whose motor skills necessitated additional support and differentiation of process, by completing a simpler circuit than what was used by the other schools (Serret & Earle, 2018). It was also important that parents/ guardians felt comfortable taking part with their child to the asynchronous and/or synchronous sessions as appropriate.

> Much was learned from this experience. It was challenging to find the required alignment between theory and practice to embed the project within all other curriculum areas (Bernay et al., 2020). Therefore, the possibility to approach all the other stakeholders as peers was vital to our success.
>
> Due to the disparate range of age and ability it also became necessary to adapt some of the language used. It was felt that, by engaging with more experienced primary teachers and university colleagues, Geoff and I, gained increased skills, knowledge, and confidence to make changes and adapt lessons as appropriate.
>
> (Herbert & Hobbs, 2018; Wang & Wong, 2017)
>
> Lastly, particularly for myself, the involvement of external partners and my University's tutor also gave the project a greater sense of gravitas among pupils, along with a palpable sense of pride because they were 'working with the University of Glasgow' and real people from the industry. The children in my class still talk about this experience now as well as colleagues who wish to build interdisciplinary learning opportunities around it.

Conclusion and Recommendations

This case study is an example of how better success in STEM education can be achieved when ideas are exchanged in an active collaborative process which is able to bring to life the meaning and nature of STEM with a balanced blending of experiences, expertise, knowledge and skills. This case study concludes with some recommendations:

1. Communication is essential throughout a truly collaborative project: scaffold dialogue, before, during and after the project to create and build the learning community.
2. Working collaboratively will give your team a wider range of abilities than you first thought: flexibility, adaptability, reflection.
3. Projects with a social justice agenda tend to provoke greater interest and commitment.

And Finally

As coordinator of this project, I would suggest team leaders harness the social capital and sense of community (Barber & King, 2016) that a multi-stakeholder project creates. In education itself, such an approach also models that authentic learning results not from transmissive pedagogy but via the dialogic facilitation of learning. I have realized how much this alternative way to work with students has generated a mutual enrichment, promoting my own professional development as well as that of my students and the wider school community. I am now working on further implementation of this strategy not only in my courses at the University of Glasgow, but also in several international workshops I am developing in collaboration with global, international universities.

Healthcare Scientist Education: Multi-stakeholder Cross-institutional Collaboration to Deliver Excellent Student Experience

Carol Ainley

- HE institutions working together can go against the nature of competition to effectively deliver an exemplary student experience.
- This chapter looks at how one group has overcome traditional barriers to collaboration and is working together successfully for the benefit of both the students and the institutions.
- Ongoing, open dialogue and ensuring all partners have an equal voice have been key to this project's success.

Introduction

Within the UK, healthcare is delivered via the National Health Service (NHS). Each of the devolved nations of the UK has its own government department to lead on the NHS delivery. In England, Health Education England (HEE) are responsible for the education and training of the workforce, with much of the 'education' aspect undertaken by HE institutions, often universities. Universities compete to deliver the academic (degree) components. In some cases, the cost of this education is provided by HEE and universities must tender for the right to deliver. In Greater Manchester, England, the University of Manchester, Manchester Metropolitan University and University of Salford joined together to form Manchester Academy for Healthcare Scientist Education, in order to tender together, rather than compete, to deliver a new set of educational programmes.

Context

The NHS and public health services in the UK employ over 50,000 healthcare scientists (National School of Healthcare Science n.d. (a)). These encompass different roles, but all 'play a vital role in the prevention, diagnosis and treatment of a huge number of medical conditions' (NHS Careers, n.d.). The role spans research, service transformation, diagnoses and rehabilitation (National School of Healthcare Science n.d. (a); NHS Careers n.d.). Historically, the career pathways, including training and education of these professions, were considered on an individual basis. In 2010, the UK government published 'Modernising Scientific Careers', a structure to provide a common career framework with common educational outcomes, aiming

to future-proof these careers (Department of Health and Social Care, 2010). The National School of Healthcare Science (NSHCS) was established to develop training and educational pathways, working with employers to develop curricula which would produce scientists fit for purpose and practice (National School of Healthcare Science n.d. (b)). As is common in the UK, HEE invited tenders from educational providers to deliver on those pathways which were to be commissioned (Health Education England n.d.). The MSc Clinical Science is the educational aspect of the Scientist Training Programme (STP), leading to a career at clinical scientist level (National School of Healthcare Science n.d.(c)). There is an MSc Clinical Science (named route) for the different specialist areas and these were the first programmes offered for tender.

MAHSE Is Born

Greater Manchester is a region in the North West of England, known for its rivalries, be they in sport, music or between academic institutions (Pride of Manchester, 2021; Williams, 2021). When the tender was released for the first MSc Clinical Science programmes, a group of foresighted senior academics recognized that by pooling expertise and working together, bids from a consortium of Greater Manchester universities would be stronger than the sum of individual bids. The vision was to create a 'Community of Practice' (Wenger-Trayner, 2015; Wenger et al., 2002) for the education of NHS trainee healthcare scientists where taught programmes cross institutional boundaries to provide the trainees the best-possible education. What began as a small team of senior academics meeting privately in a coffee shop has expanded to a team of academics, clinicians, support staff, patient and public representatives, professional bodies and students/trainees, all working together with shared values and a common goal of delivering an excellent student experience.

The Manchester Academy for Healthcare Scientist Education (MAHSE) was established in 2012 with the aim of consolidating collaborations between The University of Manchester, Manchester Metropolitan University, The University of Salford and partner NHS employers to provide the best-possible experience for healthcare scientists.

The MAHSE Team

The approach to building the team of stakeholders across the partners was based on transparency and equity. It was recognized that each partner has their strength, with each bringing something unique to the collaborative. Not all contribute equally, but all are equal partners. Beyond the universities and employers, key stakeholders in the MAHSE community of practice include students, lay (patient) representatives, clinical leads, HEE and the NSHCS. These attend stakeholder board meetings biannually and executive boards annually. Further universities are now linked to the consortium as associates, delivering some teaching and assessment and inputting to the discussions about how to ensure the collaborative works to the favour of the student experience.

MAHSE has a core team to support activities; the initial team of two is now a Director, 2x Deputy Directors, MAHSE manager, 2x administration colleagues and 2x e-learning developers – reflecting growth in the programmes and the introduction of a taught doctoral level qualification. All posts within the MAHSE core team are recruited through a transparent competitive process, with interview panels comprising representatives from partners and stakeholders. The MAHSE Director and Deputy Directors ensure that there is support for the programmes and recognition of the value of the partnership within partner institutions; if an institution withdrew from the consortium, the ability to offer an excellent student experience would be reduced. The views of all partners are brought together under MAHSE, through regular meetings and workshops, to encourage further development and allow a distinct voice in negotiating with external bodies. The size of the MAHSE Community of Practice provides a depth and breadth of experience, supporting one another in our delivery and assessment. This has led to frequent invitations as members to national workgroups, implementation groups, curriculum review groups and networks that have set national policies and shaped the education of NHS trainees.

The MAHSE Working Practices

The MAHSE core team works across the universities to ensure that there is parity of education and equity of academic experience across the 20+ discipline-specific programmes of healthcare science, something that was lacking, even within individual institutions, prior to the establishment of MAHSE. The wider team, comprising in addition to the teaching teams, lay representatives and students, work together to deliver the experience, using meetings and workshops to share best practices. The collaborative approach provides flexibility and agility when developing new, or adapting existing, programmes, allowing for the strengths of each institution to be combined to provide the best experience. Each university has their own links with NHS employers within Greater Manchester and beyond, which allows students to be taught by collaborative stakeholders who are subject experts and individuals who are at the forefront of research and clinical innovation. Cross-discipline teaching (Appleby, 2019) has been encouraged, ensuring as little duplicated effort as possible for academics and clinicians, whilst providing the basis for a career in the NHS where multi-disciplinary team working is commonplace (NHS, 2018). This is further reflected in teaching, using clinical skills facilities for inter-disciplinary learning. Lay representatives attend teaching sessions, enhancing teaching delivery and student understanding of how to engage with patients and carers.

The Student Voice

Collaborations can work better when students are regarded as partners not consumers (Healey et al., 2014). The student voice is essential for the development and improvement of our programmes. There is robust student representation, with multiple opportunities for students to feedback to both programme teams and MAHSE,

formally and informally. Thus, MAHSE can self-regulate the quality of programmes and equity of experience. Challenges raised through the student voice are addressed as a team, with discussion taking place amongst the appropriate stakeholders to ensure the best outcome. The nature of the consortium allows for open discussion to elicit improvements, even if this means moving learning and teaching resources from one university to another to increase the quality of experience, or influencing processes to ensure no student feels disadvantaged.

Technological Support

Cross-team and cross-institutional collaboration with external stakeholders has led to improved knowledge of resources available and increased innovation. The e-learning developer team members draw on their experience of their wider institutional support networks to provide dedicated professional support infrastructure to facilitate innovation in the use of technology. They work across the main partner universities, overcoming boundaries of access at non-employing universities. This approach increases access to training for teaching staff, increasing knowledge and experience and further sharing best practice.

The pedagogic approach used to facilitate interactive and active learning includes digital technologies and apps, which encourage collaboration amongst students and between lecturers and students. The collaboration has allowed us to build on previous experience at University of Manchester (Mooney et al., 2013), gifting students an iPad at the commencement of their studies. Using these in combination with commercially available apps for learning has facilitated the creation of dynamic interactive learning environments in class, allowing the lecturers to engage with students' learning and understanding during sessions permitting them to tailor the content and their delivery to create the optimum learning environment. Laboratory tours simulated at 360° help contextualize the students' learning and tackle real-life clinical scenarios in a supportive non-intimidating virtual learning environment (Bates, 2015). MAHSE have invested in equipment that is shared across institutions to support the development of such high-quality resources.

Further MAHSE Developments

As a result of the Francis Report in the UK (Francis, 2013), patient and public involvement has become a mandatory component of all HEE-funded academic programmes. The challenge facing the collaborative was how to embed lay representatives (and thus patient views) in the programmes in a meaningful rather than tokenistic way and one that enriched the learning experience of the students. We established a Patient Forum (MAHSE, n.d.), a semi-autonomous group chaired by elected lead lay representatives. Their remit is to take responsibility for the Patient Public Involvement (PPI) Strategy, share good practice and assist and support the programme teams to develop and embed PPI within all aspects of their programme. The Forum has developed a set of

guiding principles for patient and public involvement within MAHSE, ensuring all students benefit from raised awareness of the 'patient' in their practice.

Transparent operational and financial structures are key to the success of the approach. Although MAHSE is 'hosted' at one university (for legal and accounting purposes), all receive the same income for their teaching. The MAHSE administrative team support partner institutions and trainees accessing teaching at multiple universities. They are a point of contact to ensure experience is to a high standard, despite variations in working between institutions. The team also support the development of documentation to ensure that where there are multiple institutions delivering one programme, none of those institutions has an unfair burden in the administration of the programme.

Benefits MAHSE Brought

The collaborative cross-institution approach with input from external stakeholders has afforded a number of benefits. Lay representatives, employers, NHS departments and students have had input to the delivery of academic material. Programme teams have been able to draw on academic and clinical expertise from seven universities and over forty individual employers to create innovative educational provision, students have been able to experience different learning environments provided by the partner HE institutions and partnership has facilitated the sharing of good practice between the MAHSE programmes and beyond.

MAHSE's innovative approach to the design and delivery of healthcare science education is considered the 'gold standard' by HEE and the NSHCS. Since its creation in 2012 MAHSE has received multiple commendations from accreditation panels, as well as awards for collaboration and for our patient forum (Advance HE, 2018).

MAHSE has allowed for improved student experience, improved outcomes and thus, by extension, an impact on the provision of the health service. This could not have been achieved without formal collaboration, removing the barrier of 'competitor' to allow full sharing of good practice which we now share more widely. MAHSE has influence on the direction of education for healthcare scientists, working with an increasing number of organizations to produce high-quality graduates and practitioners who understand the benefits of collaboration. These graduates will become the educators of the future, perpetuating this cycle of improvement through collaboration.

To ensure the success of a complex collaboration with several different partners and stakeholders, we have been on a learning curve. Key from the outset was the need for open, honest and non-judgemental conversations to identify what could be the best student experience. Keeping this communication open and developing, through meetings, workshops and board meetings, where we reflect and plan, has ensured that the collaborative has moved forwards. We may not always agree, but everyone has a voice and that voice is always delivered in a supportive manner, to overcome challenges and improve. Provided collaboration works to these ideals, we have shown it can be successful.

Multi-partner Doctoral Training Collaborations: More than the Sum of Their Parts

Donna Palmer, Rachel Van Krimpen and Susanna Ison

- This case study describes four types of collaboration which the authors have identified as underpinning successful delivery of collaborative doctoral training programmes.
- Outlined are examples of innovative approaches to collaborative doctoral training which have been employed to initiate and maintain working partnerships between academic and non-academic stakeholders.
- Examples are provided of how those involved in delivering collaborative doctoral training partnerships share knowledge, expertise, resources and facilities.

Introduction

Over the past twenty years there has been substantial progression in the delivery of doctoral study in UK HE institutions through multi-institutional partnerships (Budd et al., 2018; McAlpine, 2017). This shift towards collaborative doctoral provision demonstrates the evolving nature of the university (Barnett, 2000) and has been guided by funders including UK Research and Innovation (UKRI). There is emphasis on the development of doctoral graduates equipped with training and skills across the breadth and depth of their chosen field of study which prepares them for future careers in and beyond academia. This remit allows institutions to take different approaches to the design and delivery of doctoral research training programmes (Newbury, 2003).

Doctoral Training Partnerships (DTPs) act as a conduit of best practice across these collaborations and rely on significant administrative expertise, interpersonal skills and energy to maximize their effectiveness and to navigate the complexity inherent in multi-institutional collaboration. Drawing on examples from three different UKRI-funded DTPs covering the Arts and Humanities, Biological Sciences and Social Sciences, which are described in more detail below, this case study focuses on four types of collaboration which we have identified as underpinning successful delivery of these programmes:

1. Intra-university collaboration
2. Inter-university collaboration
3. External collaboration
4. Researcher collaboration.

Summary of the Partnerships

Midlands4Cities DTP (M4C)

Funded by the Arts and Humanities Research Council (AHRC), this partnership brings together eight universities from across the Midlands regions of the UK. With the addition of Coventry University and the University of Warwick, M4C grew out of Midlands3Cities and recruits up to 100 Arts and Humanities PhD researchers annually.

Midlands Graduate School DTP (MGS)

This Economic and Social Research Council (ESRC)-funded partnership was established in 2016 and recruits around sixty-five PhD students each year spanning social science disciplines. Led by University of Warwick, it brings together six universities from across the Midlands. Prior to 2017, Birmingham, Warwick and Nottingham Universities ran single institution doctoral training centres.

The Nottingham BBSRC DTP

Funded by the Biotechnology and Biological Sciences Research Council (BBSRC) and led by the University of Nottingham, this programme was a single institution programme from 2012 to 2019 before partnering with Nottingham Trent University (NTU) from 2020. It is a four-year PhD programme which recruits around fifty students per year in research areas spanning the biological sciences, including industry-linked projects.

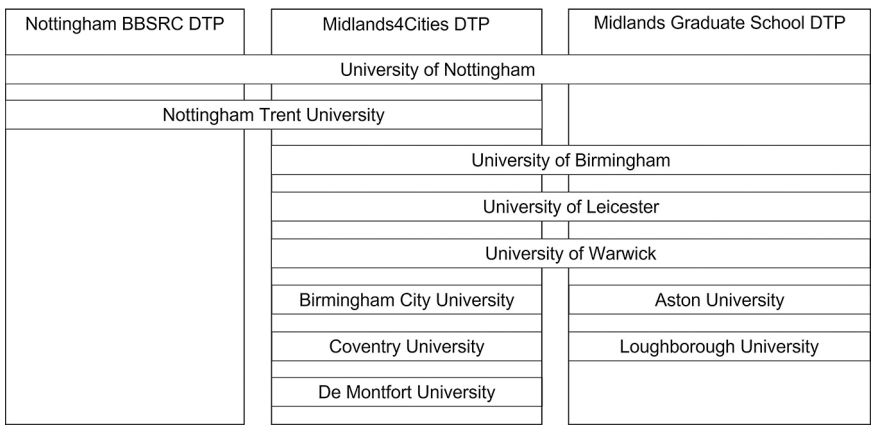

Figure 5.1 Illustration showing which institutions are involved in each of the three DTPs exemplified in this case study.

Types of Collaborations and Examples in Practice

Intra-university Collaborations

All the listed DTPs are multi-faculty and -school programmes, managed centrally within the University of Nottingham's Researcher Academy. Co-location of teams managing DTPs is an effective way to pool expertise within the institution. Managers of twenty-two cohort-based PhD programmes at the University of Nottingham benefit from membership of the Doctoral Training Programmes Managers' Network, a forum for the sharing of best practice, linked with wider university postgraduate researcher networks. It regularly results in cross-programme training development in areas including responsible research and innovation, and peer mentoring.

Many research themes addressed by these DTPs are interdisciplinary and lend themselves to be supported by PhD supervisory teams from multiple schools and faculties. MGS researchers are linked to specific training pathways, for example, 'Health and Wellbeing' draws expertise from disciplines such as Sociology, Social Policy, Health Sciences and Psychology. Approximately half of all PhD projects in the BBSRC DTP include cross-disciplinary supervision. These models allow researchers to access broader academic networks and schools to share the cost of co-funding interdisciplinary studentships.

Inter-university Collaborations

Access to Facilities and Expertise

Inter-university collaborations provide opportunities for researchers to access specialist facilities, including performance spaces or laboratory equipment, and collaborate to develop training based on partner specialisms. In the BBSRC DTP this includes bespoke introductory bioinformatics training led by NTU, and MGS researchers benefit from free access to a portfolio of Masters-level research methods modules. This is only made possible through the partnership as institutions contribute training from their own programmes and facilitate researchers registered at other institutions to attend. This requires substantial administrative support and expertise to align multiple institutional processes.

Technical Support for Inter-university Collaboration

Effective multi-institutional collaboration can be supported through effective IT solutions which help to provide consistency of experience for students regardless of their registered institution.

M4C utilizes a digital platform using Microsoft SharePoint. All M4C researchers, supervisors and administrators have access via their usual university login. The platform enables researchers to build an online profile, communicate and network with peers, access development opportunities and work collaboratively to develop workshops, symposia and conferences. The platform also offers easy access to all guidance documentation and supports progress monitoring.

In contrast, the BBSRC DTP has procured an app called Inkpath which is used by researchers across the consortium to manage their training and development and allows effective monitoring of engagement. Researcher engagement with the system is high, thanks to tailored training and an accessible mobile app interface.

External Collaborations

DTPs reach beyond the HE sector to include diverse collaborators, including industry and creative links of mutual benefit. This is not dissimilar to the concept of collaborative anchor institutions (Birch, 2013); however, the non-academic collaborators of DTPs are not necessarily located in the same geographical region. From a university perspective, these relationships broaden the training offering, strengthen strategic partnerships and may provide leverage for funding for research (both immediate and future). From the collaborator's perspective, they provide the opportunity to explore challenges through hosting a placement or co-supervising a project. They also allow collaborators to build their relationship with academia and can offer development opportunities for their own staff. A tangible outcome of these long-term collaborations is seen in employment outcomes – 8 per cent of the BBSRC DTP's first two graduating cohorts and 30 per cent of ESRC-funded researchers have been employed by their placement hosts.

Each DTP has a specific scheme to grow external collaborations through co-development of projects and co-supervision of studentships. For M4C and MGS, these projects rely on in-kind support, enabling organizations such as charities and non-government organizations to benefit from close links with academia. The BBSRC DTP offers engagements with low financial commitment to maximize inclusivity of potential collaborators. Further, each DTP offers a range of funded placement opportunities to students. Researchers benefit both personally and professionally by increasing their research network and working in another organization. Research benefits by interactions with new research groups, access to facilities and exposure to different expertise. For example, an MGS researcher was recently able to employ a novel technique to their research as a direct result of a placement, and the BBSRC DTP's partnership with the Research Complex at Harwell has seen researchers access cutting-edge scientific facilities.

External collaborations also support the governance of the programmes. M4C's Partner Advisory Group includes representatives from a mix of fifteen regional and national creative and cultural industries. They contribute to the strategic development of regional and national engagement, as well as training and professional development opportunities. Similarly, the BBSRC's External Advisory Board brings together expert voices in industry and policy engagement to support the strategic direction of the programme. A crucial role of these groups is to monitor the DTPs' training for fit with industry requirements.

Researcher Collaborations

Collaborating with Researchers to Develop the Programme

Effectively engaging with researchers at the heart of programme governance allows for the development of more effective collaboration across all the above three areas. It can guide the development of training programmes through consultation and

co-development, which in turn facilitates collaboration between researchers. The researcher voice has strongly influenced the development of the BBSRC and MGS DTP's training programmes and has significantly improved feedback. The BBSRC DTP now offers a broader range of training options at a range of levels, to allow researchers to select relevant courses at the level they require, and MGS now facilitate peer learning opportunities in addition to the more traditional taught offering.

Supporting Researcher-researcher Collaboration

All three DTPs have specific schemes to support researcher-led initiatives, both formal and informal. For example, the MGS annual conference is wholly developed and hosted by researchers, and both MGS and M4C allow researchers to apply for funding to run workshops and events on topics of common interest. An interdisciplinary research network – Midlands Music Research Network – grew from inter-cohort collaboration at the M4C Research Festival. Music researchers recognized that their diverse approaches to music research held meaningful commonalities and identified a need for an active network to build lasting connections in this space. Widely available communication software and apps are frequently used by researchers to set up groups and maintain connections with each other. These opportunities diversify the training offering as well as providing significant professional development opportunities for the researchers involved in development and delivery.

Conclusion and Recommendations

The DTPs described here are collaborative by design and each operates within a unique co-created space. This space facilitates connections between the partner institution, members of staff and the doctoral researchers. Engaging each as active collaborators allows mutual benefits and responsibility for training to be shared. Researchers access facilities they would not ordinarily have the opportunity to, they are encouraged to engage with peers from different disciplines and can contribute to the design of the programmes. Students actively decide to pursue their PhD research as part of a collaborative doctoral training programme. The collaborative interactions enrich their doctoral experience and researchers are vocal in their praise for the breadth and depth of opportunities available to them:

> One of the best things about completing your PhD on a doctoral training programme is that it prepares you for many different careers, not just those in academia.
>
> (BBSRC DTP Researcher)

> The M4C community is a lively and inspiring network with plenty of initiatives and characterised by cooperation between institutions: the annual M4C Research Festival groups together the student cohorts and showcases the wide variety of doctoral projects underway, an event everyone looks forward to!
>
> (M4C DTP Researcher)

For academic members of staff, engaging with DTPs provides fruitful ground to pursue research interests and contributions to the development of others to be made:

> Thinking of my experience as a supervisor, I consider the ESRC DTP offers an excellent frame for a PhD studentship. I really like the emphasis there is on a PhD as a point not just to produce a good thesis, but also to develop the student's wider research skills for their career. I find this very refreshing. The DTP is also there as another point of support for me as a supervisor, and it makes me think more holistically as a supervisor as well.
>
> (MGS DTP Supervisor)

Non-academic staff, who support the aforementioned, benefit from engagement with their peers across the partnerships by creating support networks, sharing resources, practices and developing new ways of working. Hall (2020) notes that 'value' within the university is visualized as surplus or profit, but the true value seen in doctoral training partnerships is human – the structures support academic collaboration at all levels, whilst also providing professional services staff with opportunities to develop their networks and learn from one another.

We have presented a range of workable approaches to multi-partner collaboration and demonstrated how these collaborative efforts combine to offer more than the sum of their parts in the doctoral training sphere. In our experience, the key recommendations arising from this case study are to:

1. recognize multi-institutional collaborations as an innovative space and approach the challenges of working across different systems and cultures creatively to achieve success and
2. recognize the significant administrative burden of realizing effective multi-faceted, multi-institutional collaborations and resource collaborations appropriately to maximize outcomes.

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Introduction

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