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## Case Study

### The benefits of sustained inter-programme collaborations between international partners

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#### Abstract

This paper explores the use of relatively small-scale, virtual, classroom-level interactions that have developed into a sustained partnership between two institutions on two sides of the Atlantic. These interactions have benefitted the student bodies and faculty members as well as addressing institutional strategic agendas (e.g. internationalization). This partnership goes beyond the common exchange program paradigm: it impacts upon the academic and transferable skillsets of the entire student body rather than just exchange students. We provide examples of these collaborative activities and discuss their particular benefits. Whilst the two programs share similar pedagogies and degree content, which has helped these interactions, we aim to show how individual faculty members can initiate and maintain inter-program interactions between any Higher Education providers with sustainable effort.

**Keywords:** Undergraduate education, institutional cooperation, exchange, international collaboration, innovative pedagogies, experiential learning

## Introduction

Inter-programme interactions are, in general, not a traditional or mandatory part of the undergraduate experience. However, with increasing student numbers, financial constraints, and the availability of university-level online courses of various shapes and sizes, universities are having to re-evaluate their role, their teaching strategies, and their degree expectations on both sides of the Atlantic (Barber et al., 2013; Weingarten et al., 2013). Responses to the current situation include strategic plans which encompass internationalization and globalization, building interdisciplinarity into courses and research, closer meshing of research and teaching, adoption of innovative pedagogical approaches, increased student-staff partnerships, and re-casting of instructional roles and job descriptions (Wilson, 2012; Barber et al., 2013; Egron-Polak & Hudson, 2014; Wihlborg & Robson, 2017). In addition to these drivers most institutions, faculties and departments have a mandate to increase visibility and distinctiveness in the academic arena in order to attract high calibre students and researchers. Some common goals are increasing the quality of the undergraduate experience, strengthening collaborative research links, and enhancement of academic reputation in order to attract increased funding. Collaborative links in both research and teaching are central to many of these ideas and can be directly related to strategic planning documents at the institutional level (e.g. Deane, 2011; University of Leicester, 2017a).

Strategies to address these goals are commonly framed and implemented in high level top-down terms, which can bear considerable cost and resource overheads to ensure their long-term sustainability. However, initiatives at the programme or classroom-level have the potential of being more agile than larger, institutional projects and can provide significant enhancements and progress towards targets with minimal resource outlay. This paper explores our own experience of individual faculty promoting inter-faculty (i.e. instructor-to-instructor) collaboration as well as furthering the internationalization agenda at the programme level for a wider range of students than can be achieved through traditional activities (e.g. student exchanges).

For the past eight years the interdisciplinary science undergraduate programmes at McMaster University, Ontario, Canada and University of Leicester, UK have engaged in a number of joint activities, beyond the established student exchange programme, that have benefitted students and instructors. This paper focusses on joint activities that have developed between two undergraduate science programmes, the Honours *Integrated Science* Programme at McMaster University, Ontario, Canada ([www.science.mcmaster.ca/isci/](http://www.science.mcmaster.ca/isci/); Eyles & Racine, 2007), and the *Natural Sciences* Programme, originally called “Interdisciplinary Science” or “IScience”, at the University of Leicester, UK ([www.le.ac.uk/natsci](http://www.le.ac.uk/natsci)). Both programs include research faculty or instructors on their teaching teams, but key instructors are teaching professors (McMaster) or teaching lecturers (Leicester) who have expertise in both teaching and scientific fields, having been trained in scientific research and being currently engaged in either scientific or pedagogical research or both. They are a relatively new category of instructor, having existed in Ontario since 1991 (Vajoczki et al., 2011) and in the UK since the 1990s (Husbands & Davies, 2000).

In this paper we will describe and reflect upon the nature of the existing interactions, identify some success factors in order to suggest how our experiences might inform further interactions between other programmes in the same institutions, in the same countries and internationally, and explore the benefits to both faculty/instructors and the student bodies.

## Example inter-programme activities

The examples presented here represent *sustained* interactions between the two programmes (i.e. they have been ongoing for multiple years or are activities that are expected to readily become so), therefore we exclude one-way resource-providing interactions (for example the common transfer of a finished product). The interactions are at the classroom- or programme-level and are instructor- or student-led, and do not require high level institutional agreement or administration. They are usually resource-neutral or part-funded. All of the interactions described here incorporate synchronous and asynchronous virtual presence and technology-mediated communications, negating the need for costly international travel and enabling activities to fit within busy working and teaching schedules.

## Virtual Learning Experiences

We are able to invite partners to teach classes, students to share research presentations, and groups to author materials collaboratively using collaborative software (such as Adobe Connect, Skype, GoogleDocs, Dropbox, etc.) and existing videoconferencing equipment (which is not otherwise heavily exploited at our institutions). These interactions, while not unusual in themselves, are the 'entry level' activities that form the foundation of communication between faculty and student bodies in the two institutions. Over time, these have built a collegial environment where the novelty of discussing ideas with remote colleagues is no longer a distraction.

## Access to research expertise

This level of collaboration has enabled greater flexibility in module content as module developers on both programmes can access research level expertise that would otherwise be unavailable. For example, McMaster students were able to interact with a Leicester astronomer while he was engaged in data collection on Mauna Kea in Hawaii. In that case, the timing of a planned classroom video-conferenced interaction, instead of being disrupted by the research visit, was enhanced by the availability of suitable video-conferencing equipment in the telescope's control room. Leicester students benefit from interactions with an expert on ancient time-keeping methods from McMaster which grants them access to a combination of history of Science, Egyptology, and astronomical expertise that is otherwise unavailable at Leicester. This can be highly motivating and beneficial to students (Sniezek, 2005). Student comments captured through end of module feedback forms indicated that such interactions were viewed positively e.g.: "[I appreciate having] different teachers who have a huge passion for their subject" (student). These interactions are also beneficial to the faculty as familiar content can be taught in novel situations, which keeps the task interesting whilst requiring minimal preparation overheads.

## Student-led collegiate activities

The faculty-led connections between the two programmes have also resulted in the formation of student-led and student-mediated links between the two student bodies in both social and academic contexts.

Both student bodies run independent societies situated in their respective Student Union structures. Initially these catered only for students within each separate institution, but international links were catalysed by a Leicester student upon returning from an exchange programme to McMaster. Both societies identified the benefits of these links, stating that they feel like they are part of a wider learning community in terms of subject knowledge and pedagogical delivery style, which they would not have experienced if they had attempted to make similar links to single-discipline student

societies within their own Universities. These international links have allowed the societies to access additional grant funding and to acquire society and personal recognition awards (e.g. The [Leicester Award](#)).

Another example of a student-led interaction is the inclusion of Leicester students in the McMaster *Synthesis* undergraduate research symposium (van Wersch et al., 2013). *Synthesis* acts a focal point for the Integrated Science programme that draws together all four years of students in a single activity and provides them with an opportunity to experience most aspects of a real research conference, from planning and reviewing to attending, submitting, and presenting. During the first year (2013) of *Synthesis*, McMaster students noted that Leicester exchange students who were present for a single term (leaving Canada in December) would not have the opportunity to present their individual research at *Synthesis* in April. The McMaster students proposed that all Leicester students, not just those who had been on exchange, could participate via videoconferencing. An initial barrier to participation was scheduling as *Synthesis* falls within the UK Easter break, but this problem was overcome by the participating Leicester students joining in from diverse locations during their break using either University of Leicester or their own videoconferencing facilities. Sessions involving Leicester students are wholly planned and run by student leaders drawn from both student bodies. Topics include not just discussion of research, but also debates on student life, the exchange programme, and future opportunities.

As alluded to earlier, our students can exchange between the two institutions, but the agreement is specific to the two programmes (plus the two Departments of Physics and Astronomy). Standard institution-led support structures are in place for both sets of students, but beyond this they may already be connected, via social media, with a large fraction of the partner's student body as a result of the activities outlined above. Therefore they find joining a study group, or participating in a videoconference pre-exchange meeting, to be a low-stress experience, as they already have a feeling of who will be participating. In our experience the existence of other inter-programme links outside of the exchange programme have helped foster a distinctly different set of outcomes for our exchange: instead of being a key individual academic experience only for the students who travel, the exchange activity has a wider impact on our students as a whole. When exchange students return there are many opportunities for continuing contact with their former hosts and for engaging their home institution peers in activities with the host programme students as well. Our exchange students often become driving forces in maintaining or creating new interactions and keeping in touch with their international peers and instructors. We consider this sustained contact to be unusual and beneficial not just to the exchange students themselves, but also to the non-exchanging students, who then develop wider perspectives and an understanding of student life at the partner institution for those students who have not had the opportunity or desire to travel.

## Participation in Undergraduate Journals

Both programmes have teaching activities that develop scientific writing skills aimed at communicating complex information to a variety of different audience types, where students write as individuals or within a group. Whilst such assessment pieces aim to provide practice in writing for diverse audiences, in reality the experience has limited authenticity as students recognise that they are writing for their assessors (Herrington & Herrington, 2006). In order to provide a more authentic experience, that would also aid students in their transition to post-graduate academic activities, in 2012 the NS programme developed an online student-run journal (JIST: the Journal of Interdisciplinary Science Topics, <https://journals.le.ac.uk/ojs1/index.php/jist>) as part of a third year module. This was based on an initiative that began as a paper-based activity in 1996 in Leicester's Department of Physics and Astronomy (Raine, 2002) and relaunched as an open access e-journal in 2009 (Hurkett, Raine, & Roy, 2014; Hurkett, Roy, & Wynn, 2016). Students from both programmes

act as authors and thus gain experience of writing primarily for an international cohort of their peers, but also with a global general public audience in mind as these short scientific papers are often picked up by news media outlets (e.g. Sanchez, 2015; Thompson, 2015; Ali, 2015) and occasionally radio and TV (e.g. Wheeler, 2014). Leicester students additionally serve as reviewers and the editorial board for all papers received.

The benefits of having two international contributing student bodies include:

**Professionalism in communication:** Communication between authors, reviewers and editors is via the journal software and editorial board minutes. They cannot rely on 'ad hoc' or casual communication (face-to-face or via social media) to further explain their responses or reasoning. Therefore all reviewers' reports and editorial board communications must be clear, detailed, professional and take into account the different scientific background of the McMaster students.

**Broad range of paper topics:** Whilst both sets of students study similar scientific concepts the exact scope and detail of the programmes is different. McMaster authors must therefore frame their scientific arguments carefully to ensure that adequate contextual and theoretical discussions are present as they cannot assume the exact scientific knowledge of the Leicester reviewers. This gives them a greater appreciation of how to construct a discussion for a wider readership than their own peers. In turn the Leicester reviewers have to respond to a broader range of topics, or familiar topics presented in a novel format, which is a more robust test of their synoptic knowledge.

**Authentic, critical reflection:** All authors have the opportunity to resubmit papers that are initially deemed ineligible for publication by reflecting on reviewers' comments. McMaster authors benefit from the style and content advice offered by the Leicester reviewers as this gives them an intermediate step between their writing being shown only to classmates and instructors, and being sent off to completely unknown reviewers if and when they submitted a paper for publication in the wider academic publishing world. Leicester students additionally benefit by critically analysing the McMaster papers and using this to reflect on their own writing style. In an informal discussion with one of the Leicester students they commented:

My group members used to tell me that my drafts for continuous assessment pieces were too long, but when they edited the drafts down I couldn't understand why they'd made some of the cuts. Then I had to review a McMaster paper with a writing style that was as rambling as mine and I suddenly realised what I had been doing wrong.

From a faculty point of view, having multiple contributing student bodies makes it much easier to achieve the critical mass required to supply an authentic experience. It also generates a genuine level of excitement in the reviewers that get to read and evaluate material created by peers outside of their normal cohort.

The flexibility of the module design in both institutions enables the asynchronous workloads to be incorporated in a rational way. For the Leicester module the relatively low number of papers submitted by students from McMaster results in a small increase in reviewing activities, which has been taken into account in the marking scheme. The structure of the McMaster *Science Literacy* module meant that, when JIST was identified as a potential destination for McMaster students' writing, a framework already existed to give students credit within this module. This has added to the McMaster students' menu of options for *Science Literacy* in their second and third years, and offers them an alternative publishing format, as JIST requires short, original, quantitative articles that would normally not be suitable for their familiar McMaster-based destinations (a science blog and a project-based research journal).

This activity has been so well received by both student cohorts, and has been proven to work well from an administrative standpoint, that participation has been extended to students from L'Université Paris Descartes (*Licence Frontières du Vivant* programme) and a further degree programme at McMaster University (*Health Sciences* programme). This activity also informed and supported the development of the *iScientist* journal at McMaster (<https://journals.mcmaster.ca/iScientist>).

### Foundations for successful inter-programme collaborations

Implementing some interactions, e.g. virtual learning experiences, are relatively straightforward if willing institutional partners can be found, but others, e.g. student-led activities, may not be easily transferrable to other programmes without 'entry level' activities being in place first. We reflect upon our interactions, and explore what has led them to be successful, in order to inform practitioners who may be considering initiating their own activities.

**Ownership by faculty:** A key to the success of these activities is that they were not imposed by external or top-down agencies, but are designed and owned by the faculty. This 'ground-up' familiarity with the framework and activities meant that instructors were better able to adapt activities whilst in-progress in order to tailor them to individual cohorts.

**Teaching orientated instructors:** It was beneficial to have teaching-orientated instructors as they have a mandate to actively engage in improving learning and develop new, enriching and creative activities. They are also likely to be people who enjoy co-teaching, discussing pedagogy, comparing and sharing techniques, and trying new things in the classroom. These traits predispose instructors to be receptive to collaboration across programs if given time to engage.

**Similarities in pedagogical approach:** Neither of our programmes teach in the traditional university lecture style. Leicester uses Problem-Based Learning (PBL), although in a form that incorporates some extensive scaffolding (Gretton, Raine, & Bartle, 2013), while McMaster has developed a PBL-related style, heavily influenced by research methods (Symons et al., 2017). While not identical, the two are close enough that when we introduce students to our partner institution's resources, they do not find the pedagogical approaches there to be alien, or to be a barrier to learning. Having a PBL-like approach is not crucial; however, we have found that pedagogical approaches that encourage student exploration facilitates inter-program interactions, as students have already adopted the mind-set of being finders or even creators of knowledge (Healey et al., 2014). They are thus more motivated to explore any new arenas that we provide for them (for example: library resources, specialist personnel, modelling tools, lab equipment, fields for data collection).

**Authenticity and buy-in:** Authenticity is a strong motivator for student engagement, but all stakeholders, particularly students, must have a clear reason to buy-in to the activity (Lombardi, 2007; Brophy, 2013). Sustaining long-term engagement in these activities does not require symmetric participation, or a complete match between curricula (e.g. the undergraduate journal), as long as it is clear how both student bodies benefit.

**Flexible assessment structures:** Our student assessment structures are flexible enough to allow these activities to be awarded credit, without disturbing our fundamental assessment model. This flexibility helps to motivate the students to engage, especially if the activity takes significant time and effort. We also note that it is certainly possible for motivation for smaller-scale interactions to come from sources other than assessment, for example from opportunities to strengthen CVs, develop new skills, network, or merely to enjoy the proposed activity.

**Asynchronous activities:** Interactions such as inter-programme lectures are necessarily synchronous, but larger activities, such as the journal, can be designed so that they can be asynchronously deployed to take into account time-zone differences, scheduling constraints at each participating institution, and busy student timetables.

**Low resource overheads:** No time or personnel, and very limited money, is allocated specifically for our inter-program interactions. We have nevertheless managed to develop and maintain collegial links between student and instructional bodies in a resource-neutral or lightly funded way. We started by developing activities that allowed interactions with little or no additional costs by utilising existing virtual lines of communication, rather than physical presence, and no additional 'specialist' equipment. Care was also taken to start with small, administrative- and resource-neutral activities. Once faculty had gained familiarity with the activities, and were fully aware of the resource implications, they were expanded to match the available faculty and resource capacities rather than initially committing to large-scale schemes that could not be sustained in the long-term.

## Discussion

Cumulatively, no student can finish either programme without some influence from the activities discussed above shaping their undergraduate experience. As a form of experiential learning these activities can enrich and vary students' pedagogical repertoire, leading to greater engagement or a wider perspective of their subject area. They also exert a positive influence during recruitment activities. Students in non-standard, smaller, or pedagogically innovative programs such as ours can be anxious about whether their "non-standard" learning experience may turn out to be detrimental to their post-university prospects, and whether they are keeping up with their traditionally-taught colleagues. These activities aid the development of collegiate interactions with students and instructors (Cotton & Wilson, 2006) who understand their academic environment which, in turn, helps the students feel "at home". This has been shown in studies such as Severines et al. (2015) to correlate with effort, engagement, and grades. Inter-programme interactions also benefit the students by providing greater access to resources in terms of instructors and project supervisors with different skills and specialisms, whole courses, data etc. of which they otherwise may not even be aware.

As instructors, we recognize that students are often so focused on their personal university experience that, when they need to articulate their achievements (for example in a job interview), they fail to identify the unique selling points which their program may have given them (e.g. Haigh & Kilmartin, 1999; Burke, Jones, & Doherty, 2005). Interacting with students outside their own programmes gives students a better perspective of their own skills, achievements, biases, and potential roles (Jones 2013).

Inter-programme interactions increase students' perspectives of themselves as members of wider communities and foster an international mind-frame by introducing them to the international knowledge marketplace, and the drivers thereof, which their normal curricula activities may not offer, thus providing a window into different academic and career opportunities. This widens their horizons in terms of work locations (e.g. Wiers-Jenssen, 2007; Pool & Sewell, 2007; Crossman & Clarke, 2010; Root & Ngampornchai, 2012) and helps to raise their employability by gaining experience of working collaboratively with people not in their immediate academic cultural group (Williams, 2005; Schech et al., 2017).

Collaborative authorship activities do not exist at only the student level. This paper is a result of ongoing pedagogical research links between the programs, which offer a larger or more diverse or

comparative study population than considering each cohort separately, helping to distinguish between local effects and general trends. Other examples of this research collaboration include McMaster's Longitudinal Study (Symons et al., 2017), which examines the effectiveness of the programmes in preparing students for their next academic step and has produced instruments which Leicester now uses for evaluating skills development in their students. Future plans include comparative studies and using the combined pool of students for student-initiated pedagogical research projects. At both institutions the effect of faculty engaging openly in pedagogical research has engendered a respect for the field and a desire to participate as investigators in both student cohorts. Given a choice from any subject area for their independent project or thesis, around 10% of students annually opt to undertake a pedagogical project at both institutions.

Whilst international inter-programme interactions provide clear benefits to the student cohort they also benefit faculty as well. The interactions between faculty in our programs has opened up a wider peer community for mutual support, new perspectives, formative feedback, idea sharing and evaluation of each other's practices. All of these aspects can contribute enormously towards professional development and garner extrinsic and intrinsic rewards (Friesen, 2012). In the authors' cases, engaging in collaborative activities is taken into account in tenure, promotion, and annual merit awards (McMaster; Bizzozero, 2014) and in Distinguished Teaching Awards, promotion and recent teaching awards (Leicester; HEA, 2017a,b,c; University of Leicester, 2017b). In both programs, our current interactions are seen as an enhancement, innovation, or benefit by our institutional oversight and quality assurance structures, rather than as a distraction from our core duties.

One of the unexpected outcomes of these interactions has been increased institutional visibility for pedagogic developments. At McMaster the interactions with a European program were more visible (based on mentions in press releases, promotional videos, and strategy documents) to McMaster's upper administrative structures than the many in-class innovations that were occurring at the same time. Conversely, the existence of the successful *Integrated Science* programme at an elite Canadian university contributed to the case for continuing support of the *Natural Sciences* initiative at Leicester.

## Conclusion

Internationalization has become a major driver in the UK and Canada in recent years at both the research level, in terms of collaborative programs, and in the context of teaching, in the shape of international student exchanges. It is interesting from a sociological view point that classroom-level, instructor-negotiated teaching collaborations across continents appear to the authors to be easier to set up and maintain than institutionally-mandated, high-level links between departments on the same campus. In order to think big we perhaps need to start by thinking small.

The activities described within this paper are low-risk, sustained programme and classroom-level interactions that are largely resource neutral. They can be asymmetric and asynchronous in nature. Once a successful activity is in place it becomes increasingly easy for all faculty involved to spot synergies between programmes and suggest additional activities or links. Exceeding a threshold number of faculty-proposed activities will result in students also suggesting new activities. Once such activities become culturally embedded the process becomes mutually reinforcing. Given the current level of interaction cumulatively, no student can finish either program without some influence from the activities discussed above positively shaping their undergraduate experience.

These activities are one way that an instructor can demonstrate impact of their teaching beyond their own programme, which can be useful for career development and can also enhance the



program's reputation on the national and international level and help differentiate it from similar offerings.

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