Encouraging Research Students to Explore and Develop Cross-disciplinary Collaborations

Roger Horn
Dean of Research Training
Deakin University (Australia)

There is no doubt that interdisciplinary research can produce wonderful results, often breakthroughs, by finding fertile ground in the area between two current disciplines, and/or by capitalising on some cross-pollination of ideas to produce a real breakthrough. Most experienced researchers would have witnessed the outcomes of interdisciplinary research and would appreciate the value of encouraging it. However, the potential benefits might not be apparent to research trainees. If we want to encourage interdisciplinary research and the exciting possibilities that it brings, we need to train our research students to understand the benefits and to have some strategies for pursuing interdisciplinary topics. We should also provide opportunities and incentives for pursuing those strategies.

The best interdisciplinary research is, I believe, done through collaboration. It would take an exceptionally gifted person to acquire sufficient expertise in more than one discipline to become a strong interdisciplinary researcher on their own. Training a person in multiple disciplines is more likely to produce breadth than depth; the phrase "jack of all trades and master of none" comes to mind. But drawing together different people with real expertise in different fields to work on one problem can produce wonderful synergies, and the vast majority of research students would be better advised to seek collaborations if they want to conduct inter- or cross-disciplinary research that is effective and at the cutting edge. Fruitful collaborations might succeed by identifying new research problems lying between two fields (interdisciplinary research), or by bringing knowledge from one field to another (cross-disciplinary research). A person from outside a particular discipline can bring an entirely new way of thinking or methodology to an established field and produce valuable new insights, while their collaborator who is trained in the established field will understand the validity or otherwise of the novel methodology. In the remainder of this paper I will consciously use the term "cross-disciplinary" research, implying collaboration and a *combination* of two disciplines, rather than "inter-disciplinary" which implies work in an area *between* two disciplines.

Following this reasoning, what we need to do is encourage collaborations between researchers. This means, first, developing positive attitudes in people so that they appreciate the benefits of collaborating and are open to ideas from outside the discipline they are trained in; second, creating opportunities for researchers to meet each other; and third, providing strategies, encouragement and incentives for people to develop real collaborations. One simple and effective incentive would be to offer seed funding for interesting cross-disciplinary grant proposals. That might seem "formal" and thus outside the scope of this panel, but we will return to it later as a useful adjunct to some less formal approaches.

Collaboration by definition requires the involvement of more than one person, and informal or

social opportunities can provide the opportunity to meet other researchers. Various possibilities exist for arranging meetings between researchers from different areas. For example, there could be social events such as parties, barbeques, social sports, or cultural tours. However, we need to do more than simply arrange meetings; we need to introduce people *and* their research topics. This is best done in a semi-formal arrangement, a forum in which people from diverse backgrounds present their research to each other. There may need to be encouragement, incentivisation, or even compulsion to attend—our experience is that all too often students are not enthusiastic about listening to research topics that are not closely related to their own. To a large extent this is, I believe, because new or inexperienced researchers have not learnt to appreciate the unexpected benefits—the random ideas, cross-fertilisation and synergies—that can come from listening to research talks from other areas. These benefits need to be explained to research students, perhaps illustrated by some real examples.

One possible way to bring research trainees together is a multi-disciplinary, faculty- or even university-wide, student conference. Students would present short conference-style talks on their research work. Clearly these need to be pitched at a level appropriate for a diverse audience. The sessions would include time for questions, as usual at a conference.

Another possible forum that has become popular in Australia and New Zealand is a three-minute thesis competition. As developed by the University of Queensland, the 3MT[1] encourages research students to present a talk about their research topic to a general audience, with no more than one static PowerPoint (or similar) slide and no other props or special effects. In addition to providing training in the skill of making "the elevator pitch," these events have proven highly informative and entertaining for the audience.

Enabling opportunities for students to hear about topics in other disciplines is only half the battle, however. The other half is to encourage them to think about possibilities for cross-disciplinary research. Could they incorporate other ideas into their own research, or contribute their own ideas, knowledge and research methods to other areas? Taking that extra step may require encouragement in the form of incentives or obligatory exercises.

We could draw a parallel with matchmaking. Only a small fraction of matches are going to produce magic, but to maximise the chances of finding that magical one we should maximise the number of contacts between researchers. To push the matchmaking analogy further, arranged matches or partnerships imposed from above are less likely to succeed than those where the participants find a natural chemistry by themselves. And still further, we might think of ways to encourage "dating" in the hope that at least a fraction of those dates will result in enduring and productive partnerships.

One possibility would be to organise a "speed dating" event in which research students are cycled through one-on-one conversations with others, each lasting a few minutes. Each person briefly describes their own research topic and research methods and the other can ask questions about it. If there is mutual interest, contact details can be exchanged and arrangements made for a longer follow-up conversation in which potential collaborations can be explored. If the pair finds no interest in each other's work, then no more than a few minutes has been lost. Whether or

[1] See http://www.uq.edu.au/grad-school/three-minute-thesis

not good matches are found, however, the greatest benefit lies in *training* people to listen to and think about research ideas and methods from other fields.

All of these suggestions (whether they include a speed-dating event or not) may need to be driven by incentives, such as making seed funding available for the best cross-disciplinary project proposals, or by less formal incentives such as challenging students to produce a proposal. Alternatively, there could be coercion in the form of making participation in these events a mandatory requirement of a research training program.