Higher Education Quality Council of Ontario

An agency of the Government of Ontario

Beyond Labs and Libraries: Career Pathways for Doctoral Students

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Published by

The Higher Education Quality Council of Ontario

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Cite this publication in the following format:

Sekuler, A. B., Crow, B., & Annan, R. B. (2013). *Beyond Labs and Libraries: Career Pathways for Doctoral Students*. Toronto: Higher Education Quality Council of Ontario.

Acknowledgements

We are grateful to HEQCO, and especially to Richard Wiggers, for their support, encouragement, and patience in the completion of this report. Thanks also to Mitacs, York University and McMaster University for additional support and to staff at each of those institutions for coordination of the focus groups and navigation through the research ethics processes: Leslie Brandreth, Peter Self, Vanessa Hayward, Barb Wells, Paul Tonin, Mike Powers, Vincent Gandrillon, Victoria Thomas, and the research ethics staff at McMaster University and York University. Thanks to Academica Group for their assistance in conducting the focus groups. Finally, and most importantly, thanks to all of the graduate students and graduates who participated in the study, and shared their insights with us so that we can help make Ontario's graduate programs even stronger.

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Introduction

Approaches to higher education have been evolving at an increasingly rapid pace over the past decade, and graduate education is a critical part of that evolution. In Ontario alone, the number of new programs offered at our institutions has increased dramatically since 2004, and between 1999 and 2009, the number of PhD students enrolled in Ontario universities has nearly doubled (Maldonado, Wiggers, & Arnold, 2013). Students are coming to graduate school at different stages of their lives (Wiggers, Lennon, & Frank, 2011) and, in today's economy, many are leaving graduate schools with increased uncertainty and anxiety about their career prospects (Maldonado et al., 2013; Patton, 2012).

Whereas in the past it was considered the norm for graduate students to move on to careers in academia, recent studies have confirmed what is apparent to most casual observers: the standard path is no longer into academia. For example, a 2010 study estimated that about 50 per cent of US PhD graduates now take positions outside of academia (Wendler, Bridgeman, Cline, Millett, Rock, Bell, & McAllister, 2010), and those who end up in academia are less likely to hold full-time tenure-stream positions. From 1975 to 2009, the proportion of full-time tenured and tenure-track faculty positions decreased as a proportion of the total number of instructional staff at US universities from approximately 45 to 24 per cent (AAUC), with part-time faculty positions comprising the majority of instructional positions (41%) by 2009. Within the Canadian context, current estimates suggest that less than 25 per cent of PhD students will end up in full-time tenure-stream research and teaching positions (Charbonneau, 2011; Tamburri, 2010).

To some extent, this shift in career demographics is related to a decreasing availability of tenure-stream positions; but some of the shift is also due to the changing interests and expectations of graduate students. A recent study suggested that many PhD students begin their graduate programs with the expectation or objective of obtaining a tenure-track appointment (Benton, 2009; Ehrenberg, Zuckerman, Goren, & Brucker, 2010), although humanities graduate students seem to have a higher expectation of a faculty position than science graduate students (Desjardins, 2012). Other research, however, shows that the numbers of students interested in faculty positions at research-intensive institutions drops precipitously throughout the course of one's PhD training (Goulden, Frasch, & Mason, 2009).

Regardless of the reason for this drop, the changing nature of student's career progression has led graduate schools across Ontario and around the world to expand their missions well beyond ensuring that students properly complete academic requirements. The United Kingdom, the European Union, and Australia have attended to these changing demographics and career path aspirations through a number of strategies such as shorter time to completion requirements and the provision of comprehensive professional skills development for graduate students (e.g., Vitae[1]). In general, graduate schools today are increasingly aware that they have a responsibility to ensure that students will succeed beyond the labs, libraries, and lecture halls.

Given the changing needs of graduate students, and the increased interest in and commitment to providing a wider range of resources to our students, the question arises: how can we ensure the programs being offered truly meet students' needs? Canada is in the relatively unique and enviable position of having done some assessment of graduate student satisfaction over the past decade. The Canadian Graduate and Professional Student Survey (CGPSS) is administered every three years across the country (2007 and 2010 have already been completed), and the third cycle of the survey (2013) is currently being administered. The CGPSS contains approximately 180 questions related to the graduate student experience, including the quality of

[1] See www.vitae.ac.uk for more information.

teaching, opportunities to present and publish, research training and career orientation, and the supportiveness of one's dissertation advisor. The Higher Education Quality Council of Ontario (HEQCO) recently worked with Ontario's universities to undertake the first comprehensive analysis of provincial CGPSS results (Zhao, 2012).

Although the results clearly vary across institutions of different sizes and with different resources, graduate students in general are quite happy with their overall graduate education and would choose to pursue graduate degrees again given the choice. In 2010, 88.1 per cent of students rated their level of satisfaction with their academic experience as "excellent," "very good," or "good." Students were less satisfied, however, with the level of career development and other professional skills training. Although the HEQCO study did not examine individual survey question results, one of the key benchmarks included questions regarding the level and quality of support and training in areas including advice/workshops on academic writing, writing grant proposals, publishing, career options inside and outside academia, ethics, and intellectual property. Ratings of these measures, summarized as "quality of research training and career orientation," were consistently lower than those summarized as the "quality of teaching" (Zhao, 2012).

In a separate analysis of the 2007 CGPSS results across Canada's most research intensive universities, only 53 per cent of students gave a positive rating for the relationship between their academic program and their professional goals (reported in Sekuler, 2011). Just over 40 per cent of graduate students in that survey said they made use of career services on their campus, and of those who did, only about 35 per cent rated the services received as very good or excellent (Sekuler, 2011).

Thus, although universities recognize the changing landscape for graduate students, results from the CGPSS suggest that universities could still do more to better meet students' needs. This is not to say that all graduate education should be turned into targeted job or career training. Rather, we need to equip all students – those in both professional and research-based programs – with core transferable skills enabling them to succeed inside or outside academia. Work from a number of groups, including the Canadian Association of Graduate Studies (CAGS) and the Council of Graduate Schools (CGS), has identified a wide range of such skills (CAGS, 2008; Wendler et al., 2010; Sekuler, 2011). In our view, those skills can be broken down into five broad categories:

- communication and collaboration
- leadership and management
- creativity and entrepreneurship
- teaching and knowledge translation
- ethics and responsible conduct of research

Where possible, these skills should be taught in the twenty-first-century context, including digital media and global fluencies. In keeping with these ideas, many graduate schools have begun offering a wider array of professional development training programs to complement the discipline-specific expertise gained through academic programs.

In some cases, programming is offered directly by graduate schools, though they typically have neither the resources nor the expertise to provide the full range of offerings required by today's students. Instead, graduate schools are better conceptualized as the hub at the centre of a broader ecosystem of student support (Sekuler, 2012). Other partners in the ecosystem include student groups, faculties and other departments within the universities, local community organizations, and national and international partners. For example, teaching and learning workshops may be offered in collaboration with universities' teaching and learning centres, and work-life balance workshops may be offered in collaboration with universities' career or student wellness centres.

Canada is also fortunate to have Mitacs as a national partner supporting its graduate student ecosystems. Mitacs promotes and supports graduate research internships with private and not-for-profit partners. It also provides a wide range of workshops for graduate students on topics related to the basics of the business environment, communication, entrepreneurship, and project management.

The goal of the current work was to begin asking how to best meet the evolving needs of graduate students, particularly those at the PhD level, with an eye toward developing a more uniform, Ontario-wide approach to developing relevant and needed initiatives and measuring successes and failures. Most of the previous analyses of career paths for graduate students have relied on information from faculty and administrators, rather than an assessment of the views of graduate students themselves. To delve a bit deeper into the concerns of graduate students as they enter the job market, we received support in early 2012 from HEQCO through their Opportunities to Innovate Fund (OIF), and conducted during the summer and fall of 2012 a series of focus groups at two institutions in Ontario, McMaster University and York University, selected for their combined breadth of coverage across SSHRC, NSERC, and CIHR disciplines.

Our goal in this study was to gain a better sense of students' perspectives on their career options after the PhD, an understanding of levels of awareness of current programming and services offered through universities and partners such as Mitacs, and a view of the extent to which these services meet the needs of students as they plan their career paths. We also hoped to draw some preliminary conclusions leading to recommendations for improving services and intellectual communities at our institutions, and ensuring that appropriate graduate student-focused programs and services are in place to help students succeed regardless of their career paths. Although one must be cautious in over-generalizing from a qualitative study in which students self-selected to take part in the focus groups, the findings from this research are consistent with and complement recent findings from other groups (e.g., Maldonado et al., 2013; Albert & Attis, 2010), and are intended to inform the development of a larger, more systematic study of these issues across a broader range of universities.

Overview of Approach: Focus Groups Among Graduate Students

Academica Group, a marketing consultancy, was commissioned to moderate the focus groups to ensure that students felt they could speak freely about the relevant issues. Focus groups proceeded according to predetermined discussion guides developed in collaboration between the authors and Academica Group, with one guide focused on understanding PhD career paths and the other on gathering feedback about Mitacs programming.

Each of the two universities sent email invitations to graduate students, asking them to participate in the focus groups. Mitacs sent email invitations to students who had participated in at least one of their programs, including the Step workshops and Accelerate and Elevate internships. The focus groups took place in July and October 2012. In total, there were 12 focus groups and four telephone interviews conducted among 67 participants. The composition of the groups skewed male overall (39 men and 28 women) and reflected a broad range of disciplines across both universities (see Table 1 below). Although the primary focus was on career paths for PhD students, the study gathered information from individuals at different stages of their academic paths, including students in early and late stages of their PhD degrees, and postdoctoral fellows and/or sessional instructors. Some of the groups that gathered feedback specifically on Mitacs programs also included master's-level graduate students.

Table 1: Academic Disciplines of Focus Group Participants

Biochemistry and Biomedical Sciences	History
Biology	Interdisciplinary Studies
Biomedical Engineering	Kinesiology
Business	Law
Chemical Engineering	Materials Science
Chemistry and Chemical Biology	Mathematics and Statistics
Civil Engineering	Mechanical Engineering
Economics	Medical Sciences
Education	Molecular and Cellular Biology
Electrical and Computer Engineering	Obstetrics and Gynecology
Engineering Design	Political Science
English	Psychology, Neuroscience and Behaviour
Environmental Studies	Public Administration
Earth Sciences	Rehabilitation Science
Geography (Human)	Social and Political Thought
Geography (Physical)	Sociology
Health Research Methodology	Theatre Studies
Health, Aging and Society	Women's Studies/Gender, Feminist and Women's Studies

Each focus group discussion lasted approximately 90 minutes and the discussions were transcribed. Participants were asked a number of questions regarding their career aspirations, the academic job market, and professional skills development (see Appendix A and B). The McMaster University and York University research ethics boards approved the experimental protocol and written informed consent was obtained from all participants at the start of each focus group session.

Academica Group provided the authors of this report with anonymized summaries of the discussions and a preliminary analysis of the findings from the focus groups. This summary report is based on Academica Group's preliminary analysis. From the discussion summaries and Academica's preliminary analysis, we identified three themes reflecting the career pathway concerns of the participants: perceptions of the academic job market, bridging the academy and industry, and recommendations on how to better attend and serve doctoral (and postdoctoral) candidates in their pursuit of academic and non-academic positions.

Summary Analysis of Focus Group Findings

Perceptions of the Current Academic Job Market

The findings from the focus group discussions indicate that there is a substantial level of anxiety among graduate students and recently graduated PhDs about their future career options. For many of those who entered graduate school intending to follow an academic career path, a position in the professoriate is now seen as untenable as the market has become increasingly competitive for a limited number of tenure-track positions. Many participants noted that they had not necessarily been aware of issues related to employment when they began their graduate education, although they became acutely aware near or after graduation that the academic job market today is not what it was 20 or even ten years ago. Comments about the current academic job market from PhD students and graduates revealed a range of emotions, from extreme pessimism to restrained optimism.

> In the beginning of the program, you still set that goal and you're like, 'I'm going to make it, I'm going to make it'… I think as time goes on you have to re-evaluate what your actual options are rather than what your dream option is. For now, I'm still kind of dreaming and hopefully I'll make it there someday.

> I attended a workshop last May, one of the PIs from our group was one of the speakers, and he put it in perspective. Over the years he has had thirty-three students who went through his lab, all of whom wanted to be in academia, two of which actually are. For me it was 'Oh crap, I need to find something else to do.'

Participants in the groups believed that there are a variety of structural issues within the current postsecondary education system that are affecting the academic job market, including cuts in funding; the end of mandatory retirement, which may be reducing the number of positions available; increased class sizes; increased number of courses being taught online; the use of contract positions to replace faculty retirements; the perceived requirement of postdoctoral ("postdoc") experience; and an increased intake of graduate students over the past decade. Students and graduates reported that their cohort in particular is facing a set of dramatic changes, yet they feel that universities have not adjusted quickly enough to help equip students to succeed in the new realities of the 21st century.

> ...you come in here with the dreams of doing something but you have to face the reality of the job market outside.

> Anyone looking at academic jobs is seeing it as pretty bleak right now; there are a lot more academics than there are jobs.

With greater competition for fewer tenure-track positions, students and graduates fear that they might become caught in a cycle of sessional teaching or postdocs as they wait for longer-term positions to become available. Participants valued postdocs as an opportunity to further research and publish, but were aware that in many fields postdocs are becoming the norm after obtaining a PhD (Weissmann, 2013), and multiple postdocs are not unheard of; some reported that at least one postdoc is expected before applying for a tenure position in many disciplines in the current market. Exacerbating this issue, participants noted, is that this increasing number of graduates with postdocs has been raising the level of competition even for sessional teaching positions. Students felt they needed more experience teaching, not just TAing, and more support in developing their teaching skills in addition to more general professional skills. There was some frustration among students who felt that it was difficult to "break into" the teaching stream as graduate students, given the highly regulated approach to assigning sessional appointments and the large numbers of sessionals who remained in those positions well after graduation. Students felt that the lack of teaching experience made

them less competitive for both traditional academic and alternative career path positions. And while sessional teaching was regarded as valued employment and experience, some explained the perceived risks of the situation, as students and graduates who obtained sessional teaching opportunities have less time to research and publish, thus limiting their chances to be competitive in traditional academic positions.

> I think the ones who really struggle are those who are fixed on staying in academia, and most of them stay in this buffer zone of postdocs where you're waiting for something to show up but there isn't much.

> [University] is reducing costs by not replacing full-time people and hiring on contract people at low wages. What that does is traps recent PhDs into doing nothing but contract to contract. When you're teaching that much now your research publications fall behind, and you'll never get a job on the tenure track.

A number of participants recognized that some of the difficulties graduates face in finding employment in academia may be due in part to the higher concentration of graduate students within the Greater Toronto Area and/or southwestern Ontario. There was a general perception that there are a greater number of teaching and tenure-track opportunities in the US or elsewhere in Canada, but family circumstances or other reasons often inhibit graduates' ability and willingness to consider positions further away.

> Most of my mentors said jobs are there if you are willing to move. More universities in the States, but those of us later in our studies, we have families and commitments and can't just pick up and move.

Students engaged in interdisciplinary research felt particularly vulnerable in the current hiring climate. These students are often expected to display mastery in multiple disciplines, but do not necessarily belong to any one of them. Although there was a feeling that interdisciplinary research was critical – and, indeed, interdisciplinary graduate programs are among the fastest growing in Ontario institutions – students in those programs felt that they have fewer academic opportunities available to them, as students believe institutions prefer to hire candidates with depth in a discipline rather than breadth across disciplines. This group of students sought more direct advising concerning strategies to ensure that their areas of research would not hinder their academic career opportunities.

> You can't apply for certain positions if you straddle two disciplines. I have an MA that's been ignored when I apply. My being interdisciplinary hurt me in getting NSERC because my field is invalid.

> Interdisciplinary is huge and... if you don't have a PhD in certain disciplines you won't be considered for something. They won't even think of you. But then there's other places that will. And when you were talking about the States, the liberal arts colleges are more open to interdisciplinary.

International students also generally felt less competitive in the current job climate. Although Canada recently revised its employment regulations to make it simpler for foreign students to work in Canada after graduation, some students in the focus groups were unaware of such changes and believed their career options to be very limited. More accessible information about immigration policies and assistance with immigration issues would help to raise awareness and provide support. International students also think that they are at a disadvantage as they may not be able to communicate their research as effectively as native English speakers. Additional specialized discipline-specific language and cultural education would be helpful in integrating many of these students and graduates.

> A lot of the people in my office are from China or Iran or Egypt and they write excellent English but in terms of presentations... there's trouble with communicating their research. I believe if the university could help in facilitating communication or helping with the spoken English it would be a great service.

> The ESL is great – some of my friends are doing it but that's just about passing an exam, it's not so much about talking and becoming part of the Canadian scene or understanding the culture.

When asked how they thought the traditional academic curriculum could be complemented, students in the focus groups pointed to a range of initiatives, including workshops on thesis preparation; publishing and writing (including writing circles); presentation and communication skills; grant writing skills; data management; project management; interviewing skills; and resume/CV preparation. Students generally felt that these services should be coordinated centrally, such as by the Schools of Graduate Studies, to enable access for all students and to encourage interaction across disciplines. It was acknowledged, however, that some areas of professional skills development should be more discipline-specific. For example, job interview advice and publication expectations differ dramatically from one field to the next, making support and skills training in those areas more appropriate at the program level. Critically, a number of students felt that they wanted more direction from departments or supervisors on which training and development opportunities to access.

> Not that we need to be coddled but have a departmental newsletter saying this is stuff you really should be doing. There's a course called Education 750 that you can take about principles of university teaching... it's a great course you can do to teach yourself how to teach beyond being a TA. But the department doesn't send an email and say, 'Hey you should really be doing this.' I get the email every four or five months... saying Education 750 is available again. But there's no pressure saying, 'This is what should be your plan, you should go to these events, take this course.'

Students noted that even opportunities to pursue the traditional requirements for the academic stream were not always as well supported as they could be, nor were students always aware of the services available to them. For example, a number of students discussed how component parts of their master's and doctoral training might focus more closely on how to publish articles and prepare grant proposals, and that students might be encouraged to begin publishing their work earlier in their studies.

It was clear, however, that some supervisors and some departments within universities provided more direct support for students than others, in terms of career advising, professional skills development, and mentorship within the academic field. Consequently, the extent to which students expressed anxiety about their future careers varied considerably depending on the level of support they received. Some students were happy with the level of support they received from their supervisors, but participants noted that if disputes arose between students and supervisors, it was not always clear what could be done to resolve those disputes, and participants felt it would be useful to have someone other than their supervisor, such as a mentor or counselor, with whom to interact to resolve the issues and minimize the chances of disputes and of alienating their supervisor.

> My relationship with my supervisor is fairly good but that's usually not the case in my department. If you don't have a [good] supervisor you're going to need some support... There's nowhere to go if you have a conflict with your supervisor. If you do, your choices are to leave or start over with somebody else. Is that realistically an option you want to give someone? [Students] will run out of funding too.

Increasing Consideration of Alternative Career Paths

In light of the issues within the current academic job market, many students and graduates are now increasingly considering "alt-ac" (alternative academic) and "post-ac" (post-academic) career paths.[2] However, a majority of focus group participants did not believe that their graduate education adequately prepared them for careers outside of traditional academic paths. The extent to which students had concerns depended on their field of study: students in professionally-oriented programs tended to have more confidence than those in research-based programs, because the former typically build more professional skills development and career planning into the programs per se. Similarly, students in fields in which industry links were common expressed more confidence about their career prospects, having already had exposure to a wider range of career options and having supervisors that were more openly supportive of students exploring non-academic career paths.

> In mechanical engineering, most research projects have some kind of industrial connection, so students get good experience with the process of going into industry.

Some students felt that for graduates of other disciplines, however, a PhD can limit one's access to alt-ac/post-ac positions, as employers may perceive applicants as under-experienced, over-educated, and perhaps "less trainable" than those graduating with a bachelor's or master's degrees. Graduates' salary expectations, often commensurate with level of education rather than work experience, were sometimes perceived as a further limitation to opportunities on the alt-ac/post-ac job market. In addition, given the number of job training options available through university and college post-graduate programs, participants perceived that competition in the marketplace is even tighter.

> A lot of people I know are going back to do diplomas, certificates, teaching degrees. So someone with ten years of education can't get a job… Whatever government jobs there are, it's such a buyer's market. They're going to take someone with an MA in policy administration who knows how to write a policy brief. This is knowledge from the unemployed friend of mine who has done informal interviews asking 'why is my CV being ignored' and they say… 'why deal with the headache?'… There's an idea that humanities academics are hard to work with, too concerned with the abstract.

Many students recognized that the skills they gained during graduate school are transferable to industry. The challenge for many lies in understanding the types of career pathways available and in knowing how to position and translate these skills to meet the needs of employers. Graduate students, both at the master's and PhD levels, felt that it was critical to develop career services catering specifically to graduate students' needs, including the development of centralized job posting sites that include both traditional academic and alt-ac/post-ac positions appropriate for people with graduate degrees; help in developing links with head-hunters and external organizations that might provide internships; provision of data on career outcomes for students with different degrees and disciplinary backgrounds, and the skill sets required for those careers; and basic resume writing and interview training. Although students noted the existence of career centres on their campuses, they generally found the services offered to be overly centred on undergraduates' needs and/or were unaware of available services to graduate students.

> When I see the ads on campus I try to go in to see what's there but I don't feel like it's set up for grad students. Definitely geared to an undergrad audience.

[2] Although the precise definition of these terms is still evolving, we follow Nervosa and Bell (2013) here, using "alt-ac" to refer to "alternative-academic" positions: academic positions other than traditional tenure-stream research and teaching positions; and using "post-ac" to refer to "post-academic" positions: positions outside the academy, even if they do make use of the sorts of skills and training obtained during the PhD, such as the ability to conduct independent research and to integrate and synthesize information.

In addition to workshops supporting professional skills development, students also noted the utility of developing networks with industry representatives and with alumni, who are able to provide career advice and serve as mentors and role models for alt-ac/post-ac careers.

> Create a database of what alumni are doing after they leave grad school so we have a network of connections. People can come in and speak about what they're doing.
>
> ...Someone not related to your supervisor that you can talk to about the job market.

Such interactions make the possibility of their own transition more tangible to students and provide concrete examples of the ways in which the academic and professional skills acquired during graduate study can be applied in a wider variety of settings. Although some programs have been proactive in arranging such mentoring systems and sponsoring visits from alt-ac/post-ac alumni, many programs have not yet established such initiatives.

Students perceived the lack of professional skills training and career mentorship at the program level to be due in part to a lingering attitude within academia that privileges traditional academic career pathways above all others. Students and graduates felt that many faculty members still hold the academic career path in higher esteem, while other faculty members simply seem oblivious to the idea that students would consider alt-ac or post-ac careers. Even when faculty do recognize that the current cohort of students are experiencing challenges finding employment, many supervisors are unable to provide guidance to their students, as their own academic careers have afforded them little understanding of opportunities outside of traditional academia.

> My department is very research intensive and academic so focus is not on 'what do you want to do next if not academia.' It's not that it is not supportive but no measures are in place for students to explore other options.
>
> Problem I'm having is my supervisor grew up in a different time where jobs were more available, or they were the pioneers of their field, especially the older professors. In that way it might be hard for them to understand. When I was talking to my committee about leaving academia they didn't understand because none of them did that.

While there are a number of exceptions, a good number of PhDs in the focus groups voiced their apprehension about raising the issue of leaving academia with their supervisors, for fear of losing support and being regarded as lacking in dedication and commitment to academia. Students also felt that, in some cases, faculty supervisors were not supportive of any kind of training that might slow progress through the degree, including internships, professional development training, or even developing networks and connections with external researchers. Indeed, students felt that it was critical for universities to make a more concerted effort to educate faculty members about the current job climate and to ensure that faculty understood that alt-ac/post-ac career choices are just as appropriate (or sometimes more appropriate) for students as traditional academic careers.

> ...I feel like there's a sense of resistance to promote [non-traditional academic work opportunities] to PhD students. Even just having a conversation about working outside academia is a hard conversation to have. It's something you just don't talk about and I think it's on the part of both students and professors who are in the department.

A common theme across the focus groups was that universities need to find a better method of communicating and targeting the initiatives and services that they offer. Many students were simply unaware of certain services or said that time pressures restrict their ability to seek out more information. There was an expectation that the communication of programs and services was the responsibility of both individual

departments or programs and Schools of Graduate Studies. Given the large number of events and initiatives offered with a university, and the sometimes opaque nature of announcements, some students reported that they would be more likely to attend events if supervisors or programs signaled which of the events would be worthwhile for them. Students also suggested that a comprehensive website, with notices of upcoming events over several months, would be useful. Other proposals included sending more aesthetically pleasing emails, making presentations about resources and training opportunities to large introductory graduate classes, or even requiring an annual mandatory information session for graduate students. It was also suggested that communications should be targeted to graduate students earlier in their programs, to raise awareness of programs and services and so that at the very least students could begin to think about how they might better plan their career pathways.

Bridging Academia and Industry

Students and graduates noted the potential utility of offering internships and cooperative/integrated education opportunities at the graduate level to help bridge the gap between academia and industry. They were supportive of programs such as those offered by Mitacs for the practical and applied experience they afforded and for their links to potential employers. Students who had participated in Mitacs programs, including its Step workshops and Accelerate internships, showed a high level of satisfaction and thought highly of the organization, describing it as “caring,” “well-respected,” and “professional.” Indeed, many of the workshops are popular among the group of students who know about them and are often waitlisted.

> [Mitacs] gives students the feeling like somebody out there cares about helping you bridge the gap between academia and industry.

One of the key barriers to greater participation in Mitacs programs, participants said, is that supervisors likely would not be receptive to programs that distracted from academic research. In this regard, students suggested that Mitacs could play a role in helping to promote, educate, and inform faculty about alt-ac/post-ac career paths by directly targeting department chairs to help disseminate information and to position the value and relevance of such programs to faculty members. The greatest issue, however, is that programs like those offered by Mitacs still are not as widely known as they might be. Many of the participants who had heard of Mitacs programs perceived them to be targeted primarily at STEM graduate students, and not all students recognized the advantages afforded by Mitacs programs (or other professional development training programs) because the content of the programming was not always clear from announcements.

> Mitacs... runs courses on campus for networking, digital skills, etc., those types of courses are beneficial.... But not everyone knows about these services or are searching them out actively, so they aren’t advertised in an effective way. Sometimes through emails but maybe if the grad studies website was more comprehensive with information about this Mitacs program.

Participants felt that it was important for professional development programs, such as those offered by Mitacs, to develop messaging and language appealing to a general graduate student audience, and to develop communication strategies targeted specifically at programs beyond STEM, including SSHRC disciplines and others where internships are less common. According to students, however, this broadening of the Mitacs programs may come with challenges: if the programs become too general and lacking in discipline-specific focus, they may become less useful for students with more experience, so a combination of general and discipline-specific programs may be ideal. With that said, Mitacs programs and the diversity of students they bring together were greatly appreciated by the students who had made use of them.

Key Lessons and Directions for Further Research

Graduate schools in Canada have made great strides in recent years toward increasing emphasis on professional skills training and career development for graduate students. However, graduate students today face a complex set of issues resulting from both internal and external pressures. Many students feel that universities are not adapting quickly enough to support them and equip them with the necessary skills to adapt to and thrive in the 21st-century economy.

Overall, the findings of this study highlight the fact that even schools with extensive programming in place can and should do more to ensure that students will be successful regardless of their chosen career path. Some comments from focus group participants indicate a general lack of awareness of programs and services that are available to graduate students. These perceptions – whether accurate or not – point to gaps in the way in which universities, departments, and supervisors relay information about the importance of and opportunities for professional skills training and alt-ac/post-ac employment to students.

It is important to note that students appreciated the opportunity to participate in a confidential forum in which they were able to express their views on pertinent issues affecting them in the current environment. While this qualitative study reflects the views of only a small group of students and graduates at two universities, many of the themes that arose point to a number of lessons to be learned, and approaches to address the key issues of graduate students.

Communication and Planning

- There should be a central repository of all opportunities/initiatives in support of students' professional skills development and career training. As the hub at the centre of the graduate student ecosystem, graduate schools are well positioned to coordinate and disseminate much of this information, though department-specific initiatives are also important in some areas.
- Ideally, students should be informed as early in their graduate careers as possible what resources are available to them, and where, how, and why they should be accessed to explore academic, alt-ac, and post-ac career options.[3]
- Methods of communication need to be improved to ensure that there are multiple paths students can take to get information (email, websites, in-class visits, direction from programs).
- Information about relevant events and initiatives should be provided as early as possible, to enable students to be proactive in their planning.
- Programming should be provided in shorter sessions scheduled at various times, including some on evenings and weekends, since it is often difficult for students to devote large periods of work days to workshops.
- Where possible, online courses should be offered to develop professional skills. Opportunities may exist here for collaboration between Ontario universities.
- Clearer statements of the content and relevance of workshops and other events should be provided, as students often cannot infer this from the title. Care should be taken to ensure that appropriate language is used so that the content is understood by students in SSHRC, CIHR, and NSERC disciplines.
- Given the relative paucity of opportunities for students in SSHRC-related disciplines to gain non-academic experience, additional programming should be offered that is targeted specifically at

[3] As highlighted in Albert & Attis (2010), the University of Pennsylvania has one excellent model of this approach, which could serve as a template for Ontario universities: www.vpul.upenn.edu/careerservices/gradstud/resources/Career_Planning_Resources_for_Doctoral_Students.pdf

students in SSHRC disciplines. Mitacs has already been working toward this, but universities can help guide the development of those programs and ensure that students are aware of the new offerings.
- Students should be made aware of the current state of the job market and of the full range of their career options as early as possible – ideally before they begin their graduate programs. Students should understand the extent to which their opportunities may be expanded if they broaden their job search geographically.
- Supervisors should be informed about their role in supporting and facilitating professional skills and development, and be encouraged to take the initiative in this regard.
- Universities should provide more opportunities for graduate students to gain teaching experience and provide training and support for pedagogical innovation.
- Information about successful approaches to professional skills training should be shared openly across programs within universities, and across universities. Ideally, a clearinghouse of approaches would be developed to enhance graduate education more generally.

Connecting with the Outside World

- Universities should promote graduate-level internship opportunities and support participation by graduate students and professors, particularly in SSHRC disciplines and others where internships are less common. This could be done with logistical and financial support from Mitacs, whose ability to support internships is sometimes limited by a lack of student and faculty awareness about the opportunities available.
- Networks of mentors should be established and include industry partners, non-profit and government research partners, and alumni. Such mentors could provide students with useful career guidance information, and could serve as role models for alt-ac/post-ac careers.
- Career nights – including information on traditional academic, alt-ac and post-ac streams – should be regular occurrences.
- Universities should do more to raise awareness of the potential links for students with private and non-profit partners, and highlight the services that Mitacs provides to help build partnership opportunities.
- Programs should be flexible in recognizing the value of internships, and could consider building internships into their programs.
- Mentors with experience in international settings should be made available to international students, both to provide information about working in Canada, but also to ensure that students are aware of their opportunities and can build networks beyond our borders.

Validating Professional Skills Development

- Universities should consider developing certificates of completion to encourage students to attend professional skills development sessions and to validate the importance of this training. Some universities already have done this, and many others are currently developing such programs.
- Faculty need to be educated about the importance of developing students' professional skills as a complement to traditional academic skills.
- Faculty also should be educated about the importance of considering alt-ac/post-ac careers; faculty should encourage students to explore all appropriate options, and should support students in their chosen career path.
- Since students are seeking guidance in determining the best ways to use their time outside of their traditional programs, faculty and departments should provide students with information on which workshops and events to attend. This will reassure students that attendance is not only appropriate, but that the university views these experiences as important for the students' education.
- Universities should pursue a wide range of approaches to delivering skills training, in recognition that

different students have different interests and needs, and that universities have different degrees of resources. In keeping with the ecosystem concept, programs should range from fully in-house, integrated programs, to the coordination of third-party providers (including Mitacs, online providers, and other universities).

- Universities should provide opportunities for students to be rewarded for the transferable skills they have learned. An example might include using 3 Minute Thesis (3MT) contests, in which students compete on the basis of their communication skills.[4]
- Students should have university-sanctioned opportunities to enhance their transferable skills beyond standard workshops. For example, universities could sponsor student-proposed initiatives in which students determine the best way to collaborate across disciplines and build communication, leadership, creativity, and knowledge translation skills.[5]
- Universities, programs, and faculty would value professional skills development and a variety of career outcomes more if they were included in the quality assurance processes overseen by the Ontario Universities Council on Quality Assurance.

Career Services

- Universities should invest in graduate-focused career services, recognizing that the needs of graduate students, and particularly PhD students, differ significantly from the needs of undergraduates.
- A network of job opportunities requiring graduate degrees should be developed. This might be most effectively done by a third party, which could make information available to students at universities across Ontario.
- Students should receive discipline-appropriate training concerning interviewing and resume/CV preparation.
- Universities should track career outcomes of their students, and provide incoming students with statistics regarding possible career paths and the skills required to pursue them.
- Career service centres should ensure that counselors have adequate training and background in areas relevant to graduate students. For example, counselors should have specialized knowledge about employment fields, to best ensure a match between the student and the career direction. Career service centres might also find ways to connect graduate students with head-hunters, who focus on placement in more specialized careers.
- Care should be taken to highlight the importance of interdisciplinary training, and the ways in which students should approach career planning when engaged in such research.
- The needs of international students also should be given special consideration so that international students receive additional guidance as needed to maximize their long-term success whether or not they choose to remain in Canada.

As noted earlier, the current study was intended to serve as a pilot for further investigations. Future studies should include students from a wider range of institutions, and more systematic data should be collected to determine precisely how much students know about offerings at their institutions, whether they take advantage of those offerings (and if not, why not), and, most critically, whether students who do take advantage of those offerings have better academic and career outcomes.

Because Mitacs provides so many resources to Ontario students, it would be useful to examine outcomes related specifically to Mitacs programming compared to other programs. In general, focus group participants who had attended Mitacs workshop sessions found them to be informative and of high quality, although there

[4] This year, 17 Ontario universities took part in the 3MT contest, with the first provincial final held at Queen's University in April.
[5] McMaster University recently began such a program, called SPICES – Student Proposals for Intellectual Communities and Engaged Scholarship – and York University offers a Scholarly Communication Series focusing on these issues.

were some suggestions that sessions should be targeted at a more generalist audience. On the other hand, some students noted that the breadth of Mitacs sessions and the ability to interact with students from a range of disciplines enhanced the experience of the workshops. If additional targeted sessions are offered, it would be useful to know whether students benefit more from depth or breadth. Key to any of these future investigations is a better understanding of the academic and career outcomes of graduate students

Overall, Ontario universities should be pleased that students value their graduate education so highly. They also should recognize, however, that the context of that education has been changing rapidly, and that views of student success must change with that context. Success no longer can be measured by how many PhD students end up in tenure-track positions. Instead, success must be measured by how many students are able to transform the academic and professional skills that they learn during their graduate training into successful and productive careers, regardless of the path they choose.

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An agency of the Government of Ontario