The Academic Profession in Canada: Successful Socialization to the Scholarly Role

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Abstract

There is little research on the socialization of doctoral students in Canada. Using survey data collected from 64 Canadian universities for the 2018 Academic Professions in the Knowledge Society project, this paper explores the reported doctoral experience of full-time academic faculty in Canadian universities who were "successfully" socialized to the role of scholar, to find potential factors affecting doctoral experience and career progression. This paper suggests that financial and faculty support are key to doctoral success. With disciplinary nuance alive and thriving, many contemporary doctoral students may be subject to unfair disadvantages, potentially one of the underlying reasons for high attrition from doctoral programs. Results indicate that teaching continues to be an overlooked aspect of doctoral training in favour of research; the associated faculty support which often accompanies research, along with the potential for funding for the research-related activity, may be significant factors affecting socialization in Canadian doctoral programs.

Keywords: university professors, academic work, doctoral socialization

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Research confirms that less than half of all doctoral students complete their programs (Council of Graduate Schools, 2009; Devine & Hunter, 2016; Lovitts, 2001; Tamburri, 2013; Walker et al., 2008). These high rates of attrition can be extremely costly for the institution (Gardner, 2007) as well as the individual (Lovitts, 2001). Publications concerned with doctoral experience specifically in Canada are not great in number (see Leyton-Brown, 2008; Niemczyk, 2017; Shera, 2003); Canadian research on doctoral studies usually relates to issues of internationalization (Gao, 2019), comparative studies (Hands, 2018; Jalongo et al., 2014; Malakyan, 2019; Sarikaya et al., 2017; Wood, 2005), or is concerned with post-PhD career trajectories (McAlpine & Austin, 2018). With sparse information on the Canadian doctoral experience specifically within the existing literature, the data derived for this paper provides up-to-date, Canada-specific information against which further comparative work can be undertaken.

As an update to the 2007 Changing Academic Profession (CAP) survey, the 2018 Academic Profession in the Knowledge-Based Society (APIKS) project examined academic work across 18 nations. The Canadian data for this study are derived from a survey of professors in various disciplines at publicly funded universities across Canada. By investigating doctoral experiences of current faculty who have become scholars in their chosen disciplines, the aim was to explore potential factors affecting successful socialization to the doctoral role, and that of scholar, in a Canadian context.

The findings of this paper indicate aspects such as funding for doctoral students, training in instructional methods for teaching activity, and formal training for academic faculty in mentoring and supervision are key factors impacting successful doctoral socialization and subsequent career pathways and require further exploration.

This paper begins by briefly examining the current literature regarding doctoral socialization, including scholarly activity, balancing responsibilities as doctoral students, and the importance of support (i.e., faculty, peers, financial), addressing the notion that disciplines remain a key factor in the socialization experience. After describing the methodology and subsequent results, I conclude with a discussion of the findings with specific reference to disciplinary considerations, where I address scholarly activity, faculty support, and financial support. As the survey respondents at the time of participation were full-time faculty members of Canadian institutions who achieved their doctoral degrees at Canadian institutions, their responses represent the experiences and perceptions of those who were “successful” in being socialized to the role of doctoral student and subsequently the role of scholar, which allows us to draw conclusions regarding the importance of specific elements for socialization success in a Canadian context and points to specific avenues requiring further research.

Literature Review

Doctoral Socialization and Scholarly Activity

Socialization is the process through which an individual becomes a member of a wider community (Austin & McDaniels, 2006a; Corcoran & Clark, 1984). Following the creation of a model for undergraduate socialization (Weidman, 1989), Weidman et al. (2001) subsequently applied elements of an earlier framework by Thornton and Nardi (1975) to the graduate student experience (Weidman & Stein, 2003); in recognition of the developmental nature of the graduate socialization process, Weidman et al.'s 2001 model was instead developed around overlapping processes in constant evolution, as opposed to a linear progression. They proposed four continuously evolving stages, or *communities*, of both informal (personal communities) and formal (professional communities and associations) influences, acting dynamically upon three core processes—knowledge acquisition, investment, and involvement—to transform students into novice professionals.

Scholarship on doctoral socialization has become more prominent within the literature (Azizova, 2016; Boden et al., 2011; Gardner, 2007, 2008, 2010a, 2010b; Gardner & Barnes, 2007; Gardner & Gopaul, 2012; Gardner & Holley, 2011; Gopaul, 2011; Johnson et al., 2017; Mendoza, 2007; Petrease-Felder et al., 2014; Sallee, 2011; Weidman et al., 2001; Weidman & Stein, 2003) and there are numerous debates around the theory of the socialization process. Generally speaking, it is agreed that socialization for doctoral students involves interaction and integration (Johnson et al., 2017) with the scholarly profession, encompassing the development of values, attitudes, and skills seen to be vital for success in a chosen discipline (Bragg, 1976; Johnson et al., 2017; Weidman & Stein, 2003). However, scholars agree that deep subject knowledge "is not in itself sufficient" (Walker et al., 2008, p. 61). Preparing future faculty involves providing doctoral students with opportunities to gain hands-on experience in various scholarly activities including writing for publication, presenting at conferences, teaching and mentoring, securing external research funding, and implementing and disseminating research (Gopaul, 2011, 2015; Walker et al., 2008).

Doctoral students often perceive their doctoral programs to be insufficient preparation for the scholarly profession (Austin, 2002; Woolston, 2019). A mismatch between the expectations and the realities of faculty careers is frequently reported, with students identifying a disconnect between their training and their subsequent academic role (Anderson & Swazey, 1998; Austin, 2002; Golde & Dore, 2001). Scholarly activity within doctoral programs involves completing a dissertation and writing up publications, in preparation for faculty roles; however, although writing and publishing research is a major component, over 60% of faculty time is spent teaching, more than all other scholarly activity (Gopaul et al., 2016). Yet, many doctoral programs that are intended to be preparation for an academic career (Anderson, 2019; Austin,

2002) offer little in the way of formal training in pedagogy (Altbach, 2007). Participation in vital scholarly activity such as teaching can be of major concern (Gopaul, 2015); feeling unprepared, doctoral students are reporting "serious anxieties" (Walker et al., 2008, p. 66) about the teaching practice.

Balancing Responsibilities

The demographics of the doctoral student population have transformed significantly over the past two decades (Baum & Steele, 2017; Gardner & Gopaul, 2012; Gardner & Holley, 2011; Gittings et al., 2018; Offerman, 2011). The majority of contemporary doctoral students would have once been considered "non-traditional"; often married with children (Woolston, 2019) and financially independent, they frequently maintain paid employment outside of any teaching or research assistantship (Gardner, 2009; Gittings et al., 2018; Offerman, 2011) to support themselves and their families, juggling multiple responsibilities.

Studies have shown that doctoral students are less likely to rely on parental support compared with undergraduates, paying for their education primarily through loans in combination with earnings from paid work, which often results in part-time study to maintain full-time employment (Gardner & Gopaul, 2012; Smith, 2000; Syverson, 1999). These students will otherwise remain reliant on institutional aid in the form of paid assistantships in teaching and research (Choy & Cataldi, 2006); however, those forced to study part-time to meet their external responsibilities will lose out on funding opportunities to their full-time peers (Niemczyk, 2017; Syverson, 1999) as the major Canadian doctoral funding programs dictate full-time study (Government of Canada, 2020). This makes financial aspects of doctoral study likely to be a significant factor in doctoral student socialization, especially given the increasing diversity of the student population (Dedman, 2019; Ortiz & Waterman, 2016).

Research has shown that students who are balancing education with external responsibility, such as child-rearing, caring for relatives, or paid employment, spend less time on campus; having irregular contact with faculty means greater difficulty in forming meaningful relationships with faculty (Watts, 2008).

Faculty Support

Research has shown that perceived support from faculty and the department can be significant factors impacting doctoral student retention (Gardner, 2007; Gittings et al., 2018; Nettles & Millet, 2006). With such low retention rates amongst programs, at around 50% continuing to completion (Jones, 2018; Sverdlik et al., 2018), "immersion into the culture of the graduate department" (Golde, 1998, p. 61) is arguably an important aspect of graduate socialization. Doctoral students commonly report insufficient support from faculty and inadequate mentoring (Austin, 2002; Peltonen et al., 2017), including the necessity to "compete for faculty time and

attention" (Anderson & Swazey, 1998, p. 8). Reporting on the CAP survey, Gopaul et al. (2016) found that just 18% of faculty described having institutionally mandated, regulatory mechanisms for the supervision of graduate students.

Scholars agree that professors act as the interface between doctoral students and their department (Austin & McDaniels, 2006b; Golde, 2005; Weidman et al., 2001), the department being the "primary socializing agent" (Barnes & Austin, 2009, p. 298) at the doctoral level. Mentoring is a key component of doctoral programs (Wladkowski & Mirick, 2019); faculty adopt the role of mentor, conveying their attitudes and behaviours to their students (Bragg, 1976). Supervision of students is a key component of academic work, yet advising and mentoring are aspects of the scholarly role in which faculty members receive little to no formal training, resorting to a reliance on repetition of the same methods which they experienced as students from their own professors (Hall & Burns, 2009). Barnes and Austin (2009) discovered that over half of faculty advisors in their study saw their role primarily involving administrative work. Mentoring was understood to be separate from the standard supervisory role (Barnes & Austin, 2009). Research has suggested that the term "mentor" has less academic connotations; students see supervisors as mentors, guiding their professional development, providing advice on a more personal level and not just not just "shepherding" them through academic milestones (Nettles & Millett, 2006).

Disciplinary Considerations

Disciplines are akin to tribes, the members of each discipline having their own set of values, attitudes, and behaviours (Becher & Trowler, 2001). The study of disciplines can help inform myriad aspects of academia, from faculty development and curriculum design to departmental teaching and research. By analyzing disciplinary structures and understanding the impact of disciplinary culture we can better inform practice (Becher, 1987) by shaping student experience to increase the likelihood of persistence (Golde, 2005).

The concept of academic disciplines is complex (Becher & Trowler, 2001); there are many ways to characterize them and numerous criteria to consider (Krishnan, 2009). With so many subject areas, it is often useful to cluster them into groups. Becher (1994) discusses naturally-forming "intellectual clusters," which are also evident in the work of Biglan (1973) and Kolb (1981). Biglan considered the nature of the subject matter itself to define his groups, whereas Kolb placed greater focus on intellectual development; however, the two derive similar conclusions regarding which disciplines naturally fall into similar groupings. Where Kolb (1981) labeled the natural sciences as "abstract" and "reflective," Biglan (1973) described them as "hard" and "pure." Conversely, the science-based professions are labeled "active" by Kolb, and "applied" by Biglan. Yet, both come to the same conclusion, placing the same disciplines into like groups despite the use of different methods and vocabulary to do so.

This paper uses the labeling of Biglan (1973) and to a lesser extent Becher (1987, 1994), clustering the disciplines and labeling each as either hard (pragmatic) or soft, and either pure (theoretical) or applied (Table 1).

Table 1

Like-Groups of Disciplines as per Biglan (1973)

Soft-Pure	Hard-Pure	Soft-Applied	Hard-Applied
Humanities and Arts	Chemistry	Business and Administration; Economics	Agriculture and Forestry
Social and Behavioural Sciences	Life Sciences	Law	Computer Science
	Physical Sciences and Mathematics	Medical Sciences; Health-Related Science; Social Services	Engineering; Manufacturing and Construction; Architecture
		Social Work and Services	
		Teacher Training and Education Science	

Gardner's (2007) study comparing doctoral students' perceptions of their socialization process in contrasting disciplines found five key themes common across disciplines: a sense of ambiguity around expectations; balancing doctoral study with other demands; transitioning to a scholarly role; development of a professional identity; and faculty, peer, and financial support. Nonetheless, research tells us that there are significant disciplinary differences between doctoral programs (Becher, 1994; Becher & Trowler, 2001; Gardner, 2007, 2010a, 2010b; Golde, 2005; Gopaul, 2011; Krishnan, 2009; Neumann, 2005; Smart et al., 2000). This paper focuses on how disciplinary aspects may affect the doctoral experience and subsequent socialization in a Canadian context.

In terms of known disciplinary differences, research tells us that the science-based disciplines receive significant funding from industry and government (Golde, 1998; Mendoza, 2007). Doctoral programs are closely linked to ongoing research projects, with students usually working in areas of interest to their supervisor, rather than for their own research interests (Golde, 2005). Students become part of a research team with little say over their research topic.

Due to the nature of the research projects and their links with wider stakeholders, doctoral students in the sciences are more likely to have greater stability in funding than those from other disciplines; students are more likely to hold research assistantships as an additional source of income (Gardner, 2009; Golde, 1998) than those in social sciences and humanities.

Doctoral students in the humanities frequently study part-time and many rely on loans to finance their studies (Altbach, 2007). When students receive funding, it is often in the form of a teaching assistantship (Golde, 1998); despite this, there is a widespread belief that students of social sciences and humanities are not prepared to teach (Altbach, 2007). The increased autonomy of those in the social sciences and humanities, not relying on becoming part of a research group, provides invaluable experience in developing original research (Walker et al., 2008), which those assigned to pre-existing projects in the science disciplines are unlikely to experience. However, research has indicated that this independence without adequate support and guidance from the department is perhaps one cause of lengthening time to completion (Gittings et al., 2018).

Method

The Canadian data obtained as part of the new 2018 APIKS project[1] that was used for this study were collected from a survey of professors at 64 publicly funded universities located across 10 Canadian provinces. The questionnaire was designed by a small, executive sample representing seven countries and passed to designated coordinators for each region to distribute accordingly. An invitation to complete an online survey was issued to 45,437 full-time professors in both French and English; however, at several institutions, the email invite was issued via internal faculty email and received by part-time staff or librarians. The 51-item survey was made available to respondents between October 24, 2017, and June 30, 2018. Of the total emails issued, just 31,728 professors were eligible to complete the survey. A total of 2,968 valid surveys (Table 2) were received, in both French (n=725) and English (n=2243), a response rate of 9.4%.

[1] The Academic Profession in the Knowledge-Based Society 2018 (APIKS) project marks a decade since the original Changing Academic Profession (CAP) study was implemented in 2007-2008, examining academic work in 18 nations. The Canadian sample of the original CAP survey was distributed across 20 publicly funded universities in 10 provinces (n=1152), the findings of which have since been widely published, providing a picture of the professoriate in a global context (Gopaul et al., 2016; Jones, Gopaul, et al., 2014; Jones, Weinrib, et al., 2012; Metcalfe, 2008; Metcalfe et al., 2016; Metcalfe & Padilla-González, 2013).

Table 2

Valid Response Rate for Canadian APIKS Survey

	Total	Valid
Email address	45,437	31,728
Completed surveys	3,798	2,968
Response rate		9.35%

Research shows that online surveys generally see lower response rates than paper-based surveys (Saleh & Bista, 2017). To mitigate this issue, the research team made sure that the valid responses (n=2968) reflected a representative sample of the larger population. The four demographic comparators of age, gender, rank, and discipline were used to conduct Chi-squared tests for Goodness of Fit (Chi^2). In all demographic areas except for gender, the Chi^2 found the difference was not significant (0.3-0.7); the sample population was found to be largely representative of the wider population of full-time professors in Canada. When investigating gender, the number of women respondents was greater than the number of women respondents in the larger population of full-time professors. This aligns with research findings, which show that women commonly are found to have higher response rates compared to men (Saleh & Bista, 2017).

Of the total valid responses, just under 88% of respondents were found to hold doctorates (n=2605) indicating a year of completion for when they received their credential. Only 2,578 respondents indicated both a year of completion for their doctoral degree in addition to naming a place of completion; just 1,702 respondents indicated achieving their doctorates in their country of current employment, Canada. Only these 1,702 participants' responses were included in the subsequent analysis.

It should be noted that the questionnaire was not designed to specifically address doctoral socialization and career pathways in this respect. Respondents were asked how they characterize their doctoral training during the first section of the questionnaire (A); just one item in particular relates directly to scholarly inquiry on the doctoral experience. The main source of data for this paper, question A-6 of the survey, asked respondents the following question: "How would you characterize the doctoral training you received?" The survey stated that the respondents should select all applicable answers. There were 13 responses to choose from, covering multiple aspects including funding, employment, scholarly activities, and method of completion. This multiple-choice question was not optimized to address pertinent

issues relating to doctoral socialization processes as discussed within the literature, so the interpretation is potentially ambiguous; there were multiple responses to be selected, and respondents were able to select as many (or few) as they wished. Table 3 shows the survey items used to operationalize doctoral socialization.

Table 3

Multiple Choice Survey Questions

No.	Question	Type
A-2	Please identify your academic discipline or field	Multiple choice
A-5	For each of your degrees, please indicate the year of completion and the country in which you obtained it	Free text
A-6	How would you characterize the doctoral training you received?	Multiple choice

Note: Questions asked as per the 2018 APIKS project, operationalized to explore doctoral socialization in a Canadian context for those successfully socialized into a scholarly role holding professorial positions in Canadian Institutions.

Results

Disciplines

The 14 disciplines listed in the survey have been grouped into like subjects (Table 4) for ease of reference in this paper, and in deference to the "traditional" discipline groupings. The number of respondents represented for each discipline and group is also shown. The soft-pure disciplines have the greatest representation among participants (in social and behavioural sciences, humanities and arts) with the hard-applied disciplines the least represented.
When looking at the disciplines over time, we can see a reduction in the number of hard-pure doctorates since the 1970s (Table 5); whether this is simply fewer respondents in these disciplines completing the survey, or if they are fewer in the population of professors in Canada, is unknown.

Table 4

Respondents Who Achieved Their Doctorates in Canada

Discipline group [a] (individual disciplines within each group)	Frequency	Percent (%)
Soft-Pure	668	39
Humanities and Arts	310	18
Social and Behavioural Sciences	358	21
Soft-Applied	587	35
Business and Administration; Economics	117	7
Law	21	1
Medical Sciences; Health-related Science; Social Services	253	15
Social Work and Services	40	2
Teacher Training and Education Science	156	9
Hard-Pure	291	17
Chemistry	49	3
Life Sciences	165	10
Physical Sciences and Mathematics	77	5
Hard-Applied	143	8
Agriculture and Forestry	22	1
Computer Science	31	2
Engineering; Manufacturing and Construction; Architecture	90	5
Other	13	1

Note: Respondents who achieved their doctorates in their country of current employment, Canada. (n=1702) represented per discipline and organised under disciplinary groups. Percentages rounded to nearest whole number.

[a] Discipline groups derived from the work of Biglan (1973) and Becher (1987, 1994).

Table 5

Respondents Who Achieved Their Doctorate, per Disciplinary Group, by Decade

Disciplines	Percent (%) per decade				
	1970s	1980s	1990s	2000s	2010s
Soft-Pure	36	39	40	41	36
Soft-Applied	18	20	29	36	46
Hard-Pure	34	30	21	15	9
Hard-Applied	11	11	9	7	8
Other	0	1	1	0	1

Note: Percent of respondents who achieved their doctorate, per disciplinary group, by decade doctorate achieved (n=1702). Percent rounded to nearest whole number.

Scholarly Activities

Scholarly activity involves myriad aspects including writing papers, to service on committees and boards, student supervision, and teaching. For doctoral students, it is not only about completing a piece of research—the dissertation—but also learning how to "do" these scholarly activities. Fewer than one-third of respondents (29%) indicated receiving training in instructional skills or learning about teaching methods during their doctoral studies (Table 6), the largest proportion being respondents in applied disciplines such as business, social science, and social work (Table 7). When we compare respondents based on decade of doctoral qualification, the results show that the percentage of respondents receiving instruction in teaching methods increases decade on decade (Figure 1), yet the percentage who undertook this activity at all is extremely low, given that teaching is a large component of the scholarly role whether that be on "teaching-based" contracts or a traditional, holistic academic appointment (Macfarlane, 2011).

Almost all respondents (>95%) in the humanities, social sciences, and teaching and education reported choosing their own research topic, and respondents in the humanities overwhelmingly (70%) reported their doctoral thesis was a monograph. Just 35% of those in chemistry and 64% in life sciences (Table 7) indicated they chose their own research topic, by comparison. In the science-based disciplines, such as life sciences, a greater percentage of respondents completed their thesis by collection of published work (73%).

Table 6

Respondents Who Selected the Following Responses to Question A6

Response selected	Frequency	Percent (%)
You chose your own research topic	1,424	84%
You were required to write a thesis or dissertation	1,667	98%
Your doctoral thesis consisted (partly or completely) of book chapters and/or journal articles	605	36%
You received intensive faculty guidance for your research	1,127	66%
You were involved in research projects with faculty or senior researchers	1,047	61%
You received training in instructional skills or learned about teaching methods	487	29%

Note. Respondents achieved their doctorates in Canada. Percent rounded to nearest whole number.

Table 7

Respondents Who Received Instruction in Teaching Methods During Doctoral Studies

Discipline group (individual disciplines within each group)	Frequency	Percent (%)	Total in discipline
Soft-Pure			
Humanities and Arts	84	27	310
Social and Behavioural Sciences	121	34	358
Soft-Applied			
Business and Administration; Economics	43	37	117
Law	5	24	21
Medical Sciences; Health-related Science; Social Services	65	26	253
Social Work and Services	9	23	40
Teacher Training and Education Science	48	31	156
Hard-Pure			
Chemistry	8	16	49
Life Sciences	45	27	165
Physical Sciences and Mathematics	18	23	77

Table 7 (cont'd)

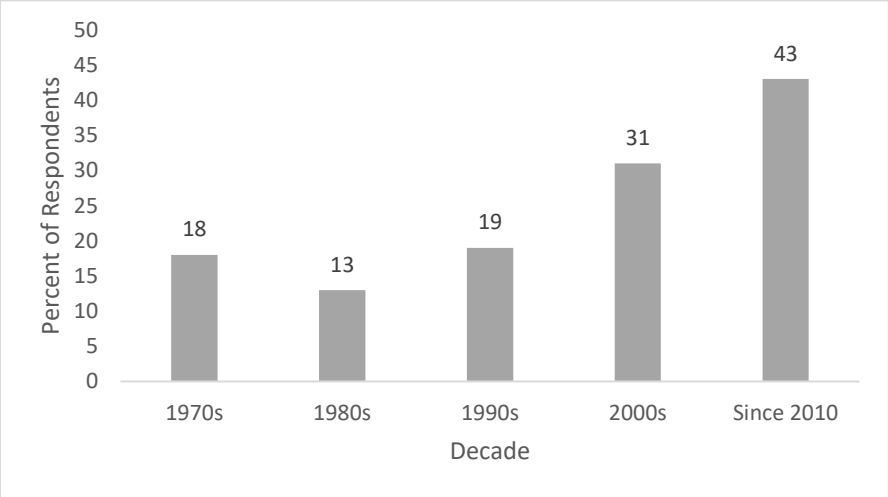
Respondents Who Received Instruction in Teaching Methods During Doctoral Studies

Discipline group (individual disciplines within each group)	Frequency	Percent (%)	Total in discipline
Hard-Applied			
Agriculture and Forestry	5	23	22
Computer Science	8	26	31
Engineering; Manufacturing and Construction; Architecture	25	28	90
Other	3	23	13
Total:	487		1,702

Note. Frequency and percentage of total respondents per discipline who indicated they received instruction in teaching methods (*n*=487) during their doctoral studies. Percent rounded to nearest whole number.

Figure 1

Respondents Who Received Instruction in Teaching Methods During Their Doctoral Studies



Note: Percentage of respondents (rounded to nearest whole number) indicating that they received instruction in teaching methods during their doctoral studies, of the total number of respondents who achieved their doctorates in that given decade (*n*=1702).

Table 8

*Respondents Who Experienced a Particular Element of Doctoral Study, for the Responses (a)–(d)**

Discipline group (individual disciplines within each group)	Response (%)			
	(a)	(b)	(c)	(d)
Soft–Pure				
Humanities and Arts	19	96	40	59
Social and Behavioural Sciences	31	96	66	67
Soft–Applied				
Business and Administration; Economics	33	96	65	71
Law	14	90	48	62
Medical Sciences; Health–related Science; Social Services	52	71	69	69
Social Work and Services	8	100	45	58
Teacher Training and Education Science	14	96	71	69
Hard–Pure				
Chemistry	39	35	80	82
Life Sciences	73	64	72	71
Physical Sciences and Mathematics	43	61	68	73
Hard–Applied				
Agriculture and Forestry	77	59	68	68
Computer Science	42	87	65	61
Engineering; Manufacturing and Construction; Architecture	36	66	53	59
Other	23	100	46	38

Note. Percentage of respondents within each discipline who provide a valid response indicating they experienced a particular element of doctoral study, for the responses (a)–(d)*. Percent rounded to nearest whole number.

*(a) Your doctoral thesis consisted of (partly or completely) book chapters and/or journal articles; (b) You chose your own research topic; (c) You were involved in research projects with faculty or senior researchers; (d) You received intensive faculty guidance for your research.

Faculty Support

More than half of all respondents worked with faculty/senior researchers on research projects and received intensive faculty guidance for research during their doctoral programs (61% and

66%, respectively). Table 9 indicates that working relationships between faculty and students during doctoral education have increased over time. Since the 1980s, there has been an increase in respondents reporting both collaboration with faculty on research and receiving intense faculty guidance; further, involvement with research projects shows a greater increase over time (by 19%) than that for intensive support (by 11%).

There does appear to be a disciplinary element when we compare across all disciplines the number of respondents indicating faculty support and involvement. Less than half of the respondents in the disciplines of humanities (40%), social work (45%), and law (48%) said they were involved in research projects with faculty, with just under 10% more in each discipline receiving "intense faculty guidance." However, when we look at support across the science-based disciplines, there is a greater propensity to work on faculty research projects in chemistry (80%) and life sciences (72%), and even greater figures when we look at those indicating they received intense faculty guidance in chemistry (82%) and life sciences (71%).

Table 9

Respondents Indicating an Element (a–c) of Doctoral Study per Decade

Response selected	1970s	1980s	1990s	2000s	Since 2010
(a) Your doctoral thesis consisted of (partly or completely) book chapters and/or journal articles	23%	26%	35%	38%	37%
(b) You were involved in research projects with faculty or senior researchers	77%	72%	78%	86%	91%
(c) You received intensive faculty guidance for your research	57%	58%	66%	68%	69%

Note: Percentage of respondents per decade who provide a valid response indicating they experienced that particular element (a–c) of doctoral study, rounded to nearest whole number.

Financial Support

Question A6 provided five options for respondents relating to their financial situation whilst undertaking doctoral studies; two were specifically related to financial support, and three regarded their employment situation. The majority of the respondents (84%) indicated receiving funding support during their doctoral studies (Table 10), and just 24% were employed outside of the academy.

The discipline with the fewest respondents who indicated receiving a scholarship or fellowship was computer sciences (71%), and the disciplines with the greatest percentage fell into the

hard-pure group—both life sciences and chemistry each showing 90% (Table 11). In addition, the hard-pure disciplines also have the fewest participants indicating an element of self-funding, with physical science and chemistry indicating just 13% and 10%, respectively.

Each of these two responses (received funding and self-funded) were able to be selected as part of the multiple-choice question, meaning participants could select one, both, or neither. Table 11 shows the number of participants in each discipline, along with how many selected each response; except for agriculture and forestry, every discipline had respondents indicating they both received a scholarship or fellowship and had an element of self-funding (by themselves or through family support). Law had the highest percentage of respondents indicating both receipt of funding in addition to an element of self-funding during doctoral studies, closely followed by teacher training and education, with the sciences and engineering reporting the least. Taking this further, when we compare the percent of respondents selecting funding with those who selected self-funding, we can see that the self-funded element is just a tiny proportion; the respondents overwhelmingly reported receiving scholarships or fellowships. This is especially true for chemistry, where 90% indicated receiving funding, but just 10% indicated an element of self-funding; however, the disparity in other science-based disciplines is not quite as large, at 88% and 77%, respectively, in the life sciences.

Table 10

Respondents Who Selected the Following Responses to Question A6

Response selected	Frequency	Percent (%)
You received a scholarship or fellowship	1,434	84
You funded your doctoral training by yourself and/or family support	630	37
You received an employment contract during your studies (for teaching or research)	1,224	72
You were employed at a research institution not belonging to the academy	538	32
You were employed outside the academy	415	24

Note. Number and percentage of respondents who completed doctorates in their current country of employment, Canada (n=1703) who provided a valid response to the stated responses to question A6. Percent rounded to nearest whole number.

Table 11

Respondents Who Indicated Receiving Funding, Self-Funded, or Both

Discipline group (individual disciplines within each group)	Received funding [a]	Elements of self-funding [b]	Total number in discipline	Both [c]
	Percent (%)	Percent (%)		Percent (%)
Soft-Pure				
Humanities and Arts	85	39	310	25
Social and Behavioural Sciences	84	42	358	26
Soft-Applied				
Business and Administration; Economics	87	45	117	32
Law	86	57	21	43
Medical Sciences; Health-related Science; Social Services	86	34	253	20
Social Work and Services	75	60	40	35
Teacher Training and Education Science	75	64	156	39
Hard-Pure				
Chemistry	90	10	49	0
Life Sciences	90	22	165	12
Physical Sciences and Mathematics	88	13	77	1
Hard-Applied				
Agriculture and Forestry	73	14	22	-14*
Computer Science	71	29	31	0
Engineering; Manufacturing and Construction; Architecture	86	18	90	3
Other	85	31	13	15

Note: Percent of total respondents in each discipline who indicated during doctoral study that they received funding, experienced an element of self-funding, or both. Percentages rounded to nearest whole number.

[a] Respondents indicating that they received an element of funding (scholarship or fellowship) during their doctoral studies

[b] Respondents indicating an element of self-funding (self, or family support) during doctoral study.

[c] Respondents who selected both responses, given as a percentage of the total number of respondents in the discipline.

* Three respondents out of 22 in Agriculture and Forestry selected neither response.

Discussion

Research has shown that there are key aspects of the socialization process which transcend disciplinary boundaries, such as the necessity to balance myriad responsibilities to take on activities associated with the scholarly role, and acquiring the financial and faculty support to do so (Gardner, 2007; Gardner & Barnes, 2007). Applying this to socialization theory (Weidman et al., 2001; Weidman & Stein, 2003), we can see that doctoral students need opportunities to secure the *knowledge* required of the doctoral process and the scholarly role through teaching and research experience, in addition to support from faculty, to enable them to *invest* time into this scholarly activity, and the chance to be *involved* with department and discipline through these relationships and associated activities.

Scholarly Activity

Teaching is a large component of scholarly careers; learning about pedagogy is a vital component of the *knowledge acquisition* aspect of Weidman's (2001) doctoral socialization framework. It appears that Canada is not immune to this issue; just 29% of respondents indicated receiving training in instructional skills or learning about teaching methods during their doctoral studies, which supports findings from previous research in which doctoral students reported feeling underprepared for the teaching element of the scholarly role (Walker et al., 2008). Despite the infrequency of formal training in pedagogy, research shows that teaching and related activities encompass the bulk of professorial activity (Gopaul et al., 2016). Although the data show an increase in respondents receiving instruction in teaching methods over the last 30 years, that figure is still remarkably low considering the ongoing focus on teaching in higher education more generally (Gopaul et al., 2016; Hall & Hulse, 2010; Johnston et al., 2013; Maynard et al., 2017; Viberg et al., 2018; Walder, 2017; Wurdinger & Allison, 2017). The "serious anxieties" (Walker et al., 2008, p. 66) about teaching practice reported by doctoral students do not appear to be unfounded and remain a concern (Casanave, 2019; Maynard et al., 2017).

The data show that the disciplines with the most respondents indicating they received training in instructional skills are those that have an applied element, such as business and administration (37%), social and behavioural sciences (34%), and teacher training and education (31%). Unsurprisingly, chemistry has the fewest respondents reporting such instruction (16%), which fits with the existing literature; with those in science-based disciplines being more likely to receive research assistantships over teaching assistantships (Gardner, 2009; Golde, 1998), it follows that there would be little in the way of training in teaching methods and more emphasis on the research element.

Students in science-based disciplines usually work in research teams rather than on individual projects (Baker & Pifer, 2015; Mendoza, 2007), which means they will potentially spend more time with faculty and peers and have the opportunity to foster productive relationships which may lead to collaboration and publication. This perhaps goes some way to explaining the greater propensity towards completing a doctoral thesis by a collection of publications for those in hard or applied disciplines with group-based research (agriculture 77%, life sciences 73%, medical sciences 55%) with greater time and financial resources for creation and dissemination of research. However, given that our participants represent those who chose to pursue scholarly careers as academic faculty, whereas the majority of those in hard disciplines tend towards careers in industry (Anderson, 2019), it could be that the predominance here for completing a thesis through collection of published work provides benefit only to those seeking careers in higher education, and not something widespread across all hard-discipline doctorates.

Faculty Support

Existing literature shows that collaboration with faculty during the doctoral process is an important factor in student retention (Gardner & Barnes, 2007; M. Jones, 2013), with poor faculty-student relationships contributing to attrition (Golde, 2000; Lovitts, 2001). As the study participants were successful scholars at Canadian institutions at the time of the survey, the element of collaboration with faculty reported during their doctoral studies indicates its value in socialization.

Although it is clearly not essential to work on projects with faculty to later acquire scholarly roles, it may indeed be beneficial; more than half of respondents indicated they worked with faculty on research projects (61%) and received intense faculty guidance (66%). However, that still leaves around one-third of respondents who did not receive any support or guidance from faculty, which is surprising considering the requirement of a doctoral supervisor.

Involvement with multiple communities (Bragg, 1976) has long been reported as a key component of the socialization process (Weidman et al., 2001; Weidman & Stein, 2003). Research collaboration with faculty and peers (Austin, 2002; Gopaul, 2015) is needed for successful integration into the department (Johnson et al., 2017). When we look at faculty support by individual discipline, the data show that the sciences received the most support and collaboration in research, perhaps due to the formally structured, group-based nature of the research, whereas fewer than half (40%) of respondents in humanities indicated working with faculty on research projects. It appears that with increased autonomy in research, students within the soft disciplines experience weaker faculty support, as a trade-off. Gittings et al. (2018) maintained that faculty support and guidance is vital to prevent over-involvement with activities outside of their dissertation research, which detracts from the student's individual research goals and may lengthen or hinder degree completion. Previous research of Canadian

doctorates has shown that those in soft disciplines such as social sciences and humanities did take longer to complete their degrees and had a higher likelihood of failing to complete altogether (Tamburri, 2013).

Fewer than one-fifth of respondents in this study represented the hard-pure disciplines; the prevalence of collaboration in science-based disciplines is not simply reflecting demographic skewness. Again, it could be that those who receive guidance from faculty and senior researchers are more inclined to follow in their footsteps and enter academic roles, compared to their peers who fail to make the same connections and seek employment outside of academia, frequently in industry (Roach & Sauermann, 2017; Stephan, 2012). This points towards close faculty-student relationships as a key component in entering the academic profession.

However, not all students are likely to have the same informative, productive supervision experience (Gopaul, 2011); the growing number of students a faculty member has to supervise is likely to divide their time, putting students in competition for their advisors' attention (Tamburri, 2013). Though supervision of students is a key component of academic work, faculty members receive little to no formal training; this means reliance on repetition of those same methods they experienced themselves during their own doctoral studies (Hall & Burns, 2009), perpetuating a "hands-off" approach. There may be more work to do in terms of adequately preparing academic staff for advising and mentoring roles, whether during doctoral study or subsequently, as continuing professional development.

Financial Support

As this study is an investigation of doctoral experiences of full-time faculty who both studied and work at Canadian institutions, it could be speculated that the predominance of funding (84%) over self-funding (37%) is a contributing factor to the successful socialization of Canadian doctoral students.

Research shows that Canadian graduate students experience insufficient financial support (McAlpine & Austin, 2018). Students generally do not have equal access to financial assistance to complete their doctoral studies; funds are unequally distributed across institutions, departments (Thomas-Long, 2007), and disciplines (Larivière, 2012). There are multiple costs associated with the expected activities of doctoral programs, such as travel for research (Fullick, 2016) which often necessitates securing external funding, and implementing and disseminating research through conference presentation and publication in scholarly journals (Gopaul, 2011, 2015; Walker et al., 2008). In both chemistry and life sciences (pure disciplines), 90% of respondents indicated they received funding for their doctoral programs, the highest among all of the disciplines. This finding supports existing research which shows that doctoral students in the hard-pure sciences traditionally receive greater funding due to close ties with industry (Golde, 1998; Mendoza, 2007), indicating this aspect of doctoral experience does not appear to have changed in the intervening decade. The data also show that the same disciplines had the

highest number of participants completing their thesis by collection of publications. It could be argued that additional funding provides a publication advantage, enabling greater involvement with the department and senior researchers, leading to greater investment in doctoral activity, leading to greater socialization success.

The soft disciplines had the majority of respondents who indicated self-funding, as well as selecting both options—receiving funding in addition to self-funding elements of their doctoral study. We can speculate that this may be due to the necessity to pay for additional elements such as research-related travel or conference attendance, which we know is a valued activity for networking as part of doctoral socialization (Gopaul, 2011, 2015; Walker et al., 2008). With science-based students working in research groups, it follows that research-related costs are likely to be covered by the project funding, whereas the independent, autonomous soft-science students such as those in humanities, would not necessarily have access to those same research-related funding sources, hence the larger proportion of self-funding. These findings suggest that greater attention to funding for research-related activities for those in the soft disciplines may be required, to prevent inequality between the disciplines.

Limitations, Implications, and Recommendations

It is important to recognize that these findings relate to those deemed successful—completing doctoral programs and acquiring full-time, academic positions as professors at higher education institutions across Canada. Conclusions cannot be drawn as perceived adequacy or otherwise of their programs from self-reporting of their doctoral experiences, only the observation that there appear to be areas of the socialization process that were more comprehensive than others. This may indicate avenues for further study to ensure future programs adequately prepare doctoral students for academic careers.

As noted in the methods section of this paper, the APIKS survey from which the data for this study were derived was not designed specifically to address issues of socialization to doctoral study or academic careers, and as such is not comprehensive in covering all the areas deemed important to the socialization process. The data cannot provide answers as to the extent of the effects of their experiences on their career success but instead indicate avenues for further research.

The key elements from the data which it could be argued were significant contributors to the socialization success of current faculty of Canadian institutions are: high levels of scholarship and fellowship funding; working with faculty; and receiving intense faculty guidance. There appears to be a significant disciplinary element to consider; those in science-based disciplines more frequently received funding, were involved with faculty in group research projects, received intensive faculty guidance, and were more likely to complete their thesis by collection of published works. It appears that these aspects may be linked—receiving funding (not having to maintain external paid employment), students spend more time on research and

collaborating in research groups, which means potential funding for research-related activity and thus greater potential for publication. Working alongside senior researchers suggests a greater likelihood of receiving guidance and support from faculty, which is more frequently reported by those in hard-pure sciences. However, these hard disciplines represent less than a quarter of the study participants. The findings suggest that increased faculty guidance may not be the norm. Existing literature suggests those in science and engineering disciplines are more likely to progress to roles in industry, rather than scholarly roles at higher education institutions (Roach & Sauermann, 2017; Stephan, 2012) which may go some way to explaining the reduction in the number of hard-pure doctorates since the 1970s. These factors, such as increased support and guidance, may be stimulating a small number of students to follow the path of their mentors into academe whilst the majority of their peers go on to have careers in industry. However, we also have to acknowledge that professors in these disciplines may simply have chosen not to respond. In either case, support and mentorship are arguably key to academic career progression across disciplines in a Canadian context.

In contrast, respondents in the "soft" disciplines, both pure and applied, indicated a greater propensity for self-funding elements of their doctoral study in addition to their scholarship and fellowship funding. Working alone with little faculty support and guidance, without the same funding for research-related activities and potentially working outside the institution, they may have less time and money available for research-related activities which suggests inequality between the disciplines. The "traditional" discipline groups as per Biglan (1973) and Becher (1987, 1994) do not appear to be quite as relevant as they once were due to the changing nature of higher education in the past few decades, though there are clear disciplinary considerations; the impact of "tribes and territories" (Becher & Trowler, 2001) in academia remain prescient and an important avenue to explore in preventing inequality and increasing persistence in doctoral programs across Canada.

Given that the study participants were full-time faculty, these disparities have not severely affected their socialization. However, juggling multiple responsibilities which limits integration with the department (Gardner, 2008; Gittings et al., 2018; Watts, 2008) may play a role in attrition for students of "soft" disciplines. Future research is recommended to further explore the experiences of doctoral students concerning their research-related activities and paid work experience across different disciplines, and—though not necessarily something which would be simple to achieve—a contemporary exploration of the experiences of those who left their doctoral programs, akin to Lovitts's (2001) seminal work two decades ago.

The data support existing literature in its reporting of infrequent training in preparation for teaching roles (Altbach, 2007; Gopaul et al., 2016; Walker et al., 2008) despite the recognition of teaching being a significant component of the scholarly role (Fairweather & Rhoads, 1995; Griffith, 2010; Hall & Hulse, 2010; Johnston et al., 2013). We cannot assume this infrequency means insufficiency, as the perceived dearth of instruction in pedagogy does not appear to have

hindered the career trajectory of the study participants, given that they achieved academic roles in higher education institutions; however, the perpetuation of inadequate training in pedagogy may be reinforcing this dearth of instruction, as scholars mimic the same beliefs and training which they themselves were subject to. In a Canadian context at least, the teaching element of the scholarly role appears overlooked and potentially undervalued in doctoral programs across disciplines. With the increasing fragmentation, the vertical stratification of academic work (G. A. Jones, 2013, Jones & Finkelstein, 2019) and the increase in part-time, teaching-only positions (Farr, 2008; Foster & Birdsell Bauer, 2018; MacDonald, 2013), we are seeing a decline in the "whole" academic appointment (Gopaul et al., 2016); it is important to ensure that there is equity in hiring and recruitment across all types of academic roles and adequate preparation for all types of careers, whether teaching-focused or research-focused.

The Canadian doctoral experience appears to closely reflect the literature for the wider doctoral population. Since much of the existing literature on this subject is predominantly associated with U.S. institutions, it follows that the Canadian data show commonalities, given that the Canadian and U.S. education systems are both highly decentralized, and their academic PhD programs follow similar structure and milestones. Future comparative research investigating doctoral experience and academic career paths in nations with smaller or more centralized higher education systems may provide new insight into factors affecting academic success and may indicate whether the decentralized nature of these systems are a contributing factor, or whether it is the structure of programs themselves that should be investigated more closely. Scholarly activity, the nature of student-faculty relationships, and the level and type of financial support provided, are all likely to vary across geographic regions and higher education systems, due to governance, language differences, and myriad other factors. With such sparse data on the Canadian doctoral experience in the literature, the data derived for this paper from the APIKS project provide up-to-date, Canada-specific information against which further comparative work can be undertaken.

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References

Altbach, P. G. (2007). Doctoral education: Present realities and future trends. In J. J. F. Forest & P. G. Altbach (Eds.), *International handbook of higher education* (pp. 65–81). Springer.

Anderson, M. S., & Swazey, J. P. (1998). Reflections on the graduate student experience: An overview. *New Directions for Higher Education*, *1998*(101), 3–13. https://doi.org/10.1002/he.10101

Anderson, S. (2019). Make science PhDs more than just a training path for academia. *Nature*, *573*(7773), 299–300. https://doi.org/10.1038/d41586-019-02586-5

Austin, A. E. (2002). Preparing the next generation of faculty: Graduate school as socialization to the academic career. *The Journal of Higher Education*, *73*(1), 94–122. https://doi.org/10.1080/00221546.2002.11777132

Austin, A. E., & McDaniels, M. (2006a). Preparing the professoriate of the future: Graduate student socialization for faculty roles. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 21, pp. 397–456). Kluwer Academic.

Austin, A. E., & McDaniels, M. (2006b). Using doctoral education to prepare faculty to work within Boyer's four domains of scholarship. *New Directions for Institutional Research*, *2006*(129), 51–65. https://doi.org/10.1002/ir.171

Azizova, Z. T. (2016). Complexity of academic socialization of historically underrepresented doctoral students: De-privileging distinctions between macro-and-micro-theoretical approaches. *JCSCORE*, *2*(2), 1–39. https://doi.org/10.15763/issn.2642-2387.2016.2.2.1-39

Baker, S. (2020, January 24). Teaching-only contracts up again as REF approaches. *Times Higher Education*. https://www.timeshighereducation.com/news/teaching-only-contracts-again-ref-approaches

Barnes, B. J., & Austin, A. E. (2009). The role of doctoral advisors: A look at advising from the advisor's perspective. *Innovative Higher Education*, *33*(5), 297–315. https://doi.org/10.1007/s10755-008-9084-x

Baum, S., & Steele, P. (2017). *Who goes to graduate school and who succeeds?* Access Group and Urban Institute. https://www.ssrn.com/abstract=2898458

Becher, T. (1987). Disciplinary discourse. *Studies in Higher Education*, *12*(3), 261–274. https://doi.org/10.1080/03075078712331378052

Becher, T. (1994). The significance of disciplinary differences. *Studies in Higher Education*, *19*(2), 151–161. https://doi.org/10.1080/03075079412331382007

Becher, T., & Trowler, P. (2001). *Academic tribes and territories: Intellectual enquiry and the culture of disciplines* (2nd ed). Open University Press.

Biglan, A. (1973). The characteristics of subject matter in different academic areas. *Journal of Applied Psychology*, *57*(3), 195–203. https://doi.org/10.1037/h0034701

Boden, D., Borrego, M., & Newswander, L. K. (2011). Student socialization in interdisciplinary doctoral education. *Higher Education*, *62*(6), 741–755.

Bragg, A. K. (1976). *The socialization process in higher education* (ERIC/Higher Education Research Report No. 7). American Association for Higher Education. https://eric.ed.gov/?id=ED132909

Casanave, C. P. (2019). Performing expertise in doctoral dissertations: Thoughts on a fundamental dilemma facing doctoral students and their supervisors. *Journal of Second Language Writing*, *43*, 57–62. https://doi.org/10.1016/j.jslw.2018.02.005

Choy, S. P., & Cataldi, E. F. (2006). *Student financing of graduate and first-professional education, 2003–04: Profiles of students in selected degree programs and part-time students* (Statistical Analysis Report NCES 2006-185). U.S. Department of Education; National Center for Education Statistics. https://doi.org/10.1037/e492172006-013

Corcoran, M., & Clark, S. M. (1984). Professional socialization and contemporary career attitudes of three faculty generations. *Research in Higher Education*, *20*(2), 131–153. https://doi.org/10.1007/BF00991464

Council of Graduate Schools. (2009). *Ph.D. completion and attrition: Findings from exit surveys of PhD completers*. Author.

Dedman, B. (2019, March 1). College students are more diverse than ever. Faculty and administrators are not. *AAC&U News*. https://www.aacu.org/aacu-news/newsletter/2019/march/facts-figures

Devine, K., & Hunter, K. (2016). Doctoral students' emotional exhaustion and intentions to leave academia. *International Journal of Doctoral Studies*, *11*, 35–61. https://doi.org/10.28945/3396

Fairweather, J. S., & Rhoads, R. A. (1995). Teaching and the faculty role: Enhancing the commitment to instruction in American colleges and universities. *Educational Evaluation and Policy Analysis*, *17*(2), 179–194. https://doi.org/10.3102/01623737017002179

Farr, M. (2008, November 3). For teaching-only faculty, a controversial role. *University Affairs*. https://www.universityaffairs.ca/features/feature-article/those-who-can-teach/

Foster, K., & Birdsell Bauer, L. (2018). *Out of the shadows: Experiences of contract academic staff*. CAUT. https://www.caut.ca/sites/default/files/cas_report.pdf

Fullick, M. (2016). It's time to rethink academic conference funding. *University Affairs*. https://www.universityaffairs.ca/opinion/speculative-diction/its-time-to-re-think-academic-conference-funding/

Gao, Y. (2019). Experiences of Chinese international doctoral students in Canada who withdrew: A narrative inquiry. *International Journal of Doctoral Studies*, *14*, 259–276. https://doi.org/10.28945/4240

Gardner, S. K. (2007). "I heard it through the grapevine": Doctoral student socialization in chemistry and history. *Higher Education*, *54*(5), 723–740. https://doi.org/10.1007/s10734-006-9020-x

Gardner, S. K. (2008). Fitting the mold of graduate school: A qualitative study of socialization in doctoral education. *Innovative Higher Education*, *33*(2), 125–138. https://doi.org/10.1007/s10755-008-9068-x

Gardner, S. K. (Ed.). (2009). The development of doctoral students: Phases of challenge and support. *ASHE Higher Education Report*, *34*(6), 1–127. https://doi.org/10.1002/aehe.3406

Gardner, S. K. (2010a). Contrasting the socialization experiences of doctoral students in high- and low-completing departments: A qualitative analysis of disciplinary contexts at one institution. *The Journal of Higher Education*, *81*(1), 61–81. https://doi.org/10.1080/00221546.2010.11778970

Gardner, S. K. (2010b). Faculty perspectives on doctoral student socialization in five disciplines. *International Journal of Doctoral Studies*, *5*, 39–53. https://doi.org/10.28945/1310

Gardner, S. K., & Barnes, B. J. (2007). Graduate student involvement: Socialization for the professional role. *Journal of College Student Development*, *48*(4), 369–387. https://doi.org/10.1353/csd.2007.0036

Gardner, S. K., & Gopaul, B. (2012). The part-time doctoral student experience. *International Journal of Doctoral Studies*, *7*, 63–78. https://doi.org/10.28945/1561

Gardner, S. K., & Holley, K. A. (2011). "Those invisible barriers are real": The progression of first-generation students through doctoral education. *Equity & Excellence in Education*, *44*(1), 77–92. https://doi.org/10.1080/10665684.2011.529791

Gittings, G., Bergman, M., Shuck, B., & Rose, K. (2018). The impact of student attributes and program characteristics on doctoral degree completion. *New Horizons in Adult Education and Human Resource Development*, *30*(3), 3–22. https://doi.org/10.1002/nha3.20220

Golde, C. M. (1998). Beginning graduate school: Explaining first-year doctoral attrition. *New Directions for Higher Education*, *1998*(101), 55–64. https://doi.org/10.1002/he.10105

Golde, C. M. (2000). Should I stay or should I go? Student descriptions of the doctoral attrition process. *The Review of Higher Education*, *23*(2), 199–227. https://doi.org/10.1353/rhe.2000.0004

Golde, C. M. (2005). The role of the department and discipline in doctoral student attrition: Lessons from four departments. *The Journal of Higher Education*, *76*(6), 669–700. https://doi.org/10.1080/00221546.2005.11772304

Golde, C. M., & Dore, T. M. (2001). At cross purposes: What the experiences of today's doctoral students reveal about doctoral education. https://eric.ed.gov/?id=ED450628

Gopaul, B. (2011). Distinction in doctoral education: Using Bourdieu's tools to assess the socialization of doctoral students. *Equity & Excellence in Education*, *44*(1), 10–21. https://doi.org/10.1080/10665684.2011.539468

Gopaul, B. (2015). Inequality and doctoral education: Exploring the "rules" of doctoral study through Bourdieu's notion of field. *Higher Education*, *70*(1), 73–88. https://doi.org/10.1007/s10734-014-9824-z

Gopaul, B., Jones, G. A., Weinrib, J., Metcalfe, A., Fisher, D., Gingras, Y., & Rubenson, K. (2016). The academic profession in Canada: Perceptions of Canadian university faculty about research and teaching. *Canadian Journal of Higher Education*, *46*(2), 55–77. https://doi.org/10.47678/cjhe.v46i2.185269

Government of Canada. (2020). *Canada graduate scholarships—Doctoral program*. https://www.nserc-crsng.gc.ca/students-etudiants/pg-cs/cgsd-bescd_eng.asp

Griffith, A. L. (2010). Persistence of women and minorities in STEM field majors: Is it the school that matters? *Economics of Education Review*, *29*(6), 911–922. https://doi.org/10.1016/j.econedurev.2010.06.010

Hall, L., & Burns, L. (2009). Identity development and mentoring in doctoral education. *Harvard Educational Review*, 79(1), 49–70. https://doi.org/10.17763/haer.79.1.wr25486891279345

Hall, S., & Hulse, D. (2010). Perceptions of doctoral level teaching preparation in counselor education. *Journal of Counselor Preparation and Supervision*, *1*(2). https://doi.org/10.7729/12.0108

Hands, A. (2018). Examining the basic psychological needs of library and information science doctoral students. *International Journal of Doctoral Studies*, *13*, 389–411. https://doi.org/10.28945/4135

Jalongo, M. R., Boyer, W., & Ebbeck, M. (2014). Writing for scholarly publication as "tacit knowledge": A qualitative focus group study of doctoral students in education. *Early Childhood Education Journal*, *42*(4), 241–250. https://doi.org/10.1007/s10643-013-0624-3

Johnson, C. M., Ward, K. A., & Gardner, S. K. (2017). Doctoral student socialization. In J. C. Shin & P. Teixeira (Eds.), Encyclopedia of international higher education systems and institutions (pp. 1–4). Springer. https://doi.org/10.1007/978-94-017-9553-1_296-1

Johnston, T. C., Milkman, M. I., & McCoy, J. P. (2013). Doctoral training in teaching and preparedness of early-career marketing educators. *Academy of Educational Leadership Journal*, *17*(3), 107–116.

Jones, G. A. (2013). The horizontal and vertical fragmentation of academic work and the challenge for academic governance and leadership. *Asia Pacific Education Review*, *14*(1), 75–83. https://doi.org/10.1007/s12564-013-9251-3

Jones, G. A. (2018). Doctoral education in Canada. In J. C. Shin, B. M. Kehm, & G. A. Jones (Eds.), Doctoral education for the knowledge society: Convergence or divergence in national approaches? (pp. 147–164). Springer. https://doi.org/10.1007/978-3-319-89713-4_9

Jones, G. A., & Finkelstein, M. J. (2019). Looking across systems: Implications for comparative, international studies of academic work. In M. J. Finkelstein & G. A. Jones (Eds.), *Professorial pathways: Academic careers in a global perspective* (pp. 265–290). Johns Hopkins University Press.

Jones, G. A., Gopaul, B., Weinrib, J., Metcalfe, A. S., Fisher, D., Gingras, Y., & Rubenson, K. (2014). Teaching, research, and the Canadian professoriate. In J. C. Shin, A. Arimoto, W. K. Cummings, & U. Teichler (Eds.), Teaching and research in contemporary higher education: Systems, activities and rewards (pp. 335–356). Springer. https://doi.org/10.1007/978-94-007-6830-7_18

Jones, G. A., Weinrib, J., Metcalfe, A. S., Fisher, D., Rubenson, K., & Snee, I. (2012). Academic work in Canada: The perceptions of early-career academics. *Higher Education Quarterly*, *66*(2), 189–206. https://doi.org/10.1111/j.1468-2273.2012.00515.x

Jones, M. (2013). Issues in doctoral studies—Forty years of journal discussion: Where have we been and where are we going? *International Journal of Doctoral Studies*, *8*, 83–104. https://doi.org/10.28945/1871

Kolb, D. A. (1981). Learning styles and disciplinary differences. In A. W. Chickering (Ed.), *The modern American college*. Jossey-Bass.

Krishnan, A. (2009). What are academic disciplines? Some observations on the disciplinarity vs. interdisciplinarity debate (NCRM Working Paper Series No. 03/09). ESRC National Centre for Research Methods. http://eprints.ncrm.ac.uk/783/

Larivière, V. (2012). On the shoulders of students? The contribution of PhD students to the advancement of knowledge. *Scientometrics*, *90*(2), 463–481. https://doi.org/10.1007/s11192-011-0495-6

Leyton-Brown, D. (2008). Social and legal aspects of doctoral training in Canada: Criteria and consequences of admission. *Higher Education in Europe*, *33*(1), 111–123. https://doi.org/10.1080/03797720802228241

Lovitts, B. E. (2001). *Leaving the ivory tower: The causes and consequences of departure from doctoral study*. Rowman & Littlefield.

MacDonald, M. (2013, January 9). Sessionals, up close. *University Affairs*. https://www.universityaffairs.ca/features/feature-article/sessionals-up-close/

Macfarlane, B. (2011). The morphing of academic practice: Unbundling and the rise of the para-academic. *Higher Education Quarterly*, *65*(1), 59–73. https://doi.org/10.1111/j.1468-2273.2010.00467.x

Malakyan, P. G. (2019). International curriculum and conceptual approaches to doctoral programs in leadership studies. *International Journal of Doctoral Studies*, *14*, 325–350. https://doi.org/10.28945/4254

Maynard, B. R., Labuzienski, E. M., Lind, K. S., Berglund, A. H., & Albright, D. L. (2017). Social work doctoral education: Are doctoral students being prepared to teach? *Journal of Social Work*, *17*(1), 91–114. https://doi.org/10.1177/1468017316637226

McAlpine, L., & Austin, N. (2018). Humanities PhD graduates: Desperately seeking careers? *Canadian Journal of Higher Education (CJHE/RCES)*, *48*(2), 1–19. https://doi.org/10.47678/cjhe.v48i2.188157

Mendoza, P. (2007). Academic capitalism and doctoral student socialization: A case study. *The Journal of Higher Education*, *78*(1), 71–96. https://doi.org/10.1353/jhe.2007.0004

Metcalfe, A. S. (2008). The changing academic profession in Canada: Exploring themes of relevance, internationalization, and management. In *Report of the International Conference on the Changing Academic Profession* (pp. 57–73). Research Institute for Higher Education.

Metcalfe, A. S., Fisher, D., Jones, G., Gingras, Y., Rubenson, K., & Snee, I. (2016). The changing academic profession in Canada: Personal characteristics, career trajectories, sense of identity/commitment and job satisfaction. In J. Galaz-Fontes, A. Arimoto, U. Teichler, & J. Brennan (Eds.), *Biographies and careers throughout academic life* (pp. 105–120). Springer. https://doi.org/10.1007/978-3-319-27493-5_7

Metcalfe, A. S., & Padilla-González, L. (2013). Underrepresentation of women in the academic profession: A comparative analysis of the North American region. *NASPA Journal About Women in Higher Education*, *6*(1), 1–21. https://doi.org/10.1515/njawhe-2013-0002

Nettles, M. T., & Millett, C. M. (2006). *Three magic letters: Getting to Ph.D*. Johns Hopkins University Press.

Neumann, R. (2005). Doctoral differences: Professional doctorates and PhDs compared. *Journal of Higher Education Policy and Management*, *27*(2), 173–188. https://doi.org/10.1080/13600800500120027

Niemczyk, E. K. (2017). Doctoral research education in Canada: Full-time and part-time students' access to research assistantships. *Brock Education Journal*, *26*(1), 52–67. https://doi.org/10.26522/brocked.v26i1.496

Offerman, M. (2011). Profile of the nontraditional doctoral degree student. *New Directions for Adult and Continuing Education*, *2011*(129), 21–30. https://doi.org/10.1002/ace.397

Ortiz, A. M., & Waterman, S. J. (2016). The changing student population. In G. S. McClellan & J. Stringer (Eds.), *The handbook of student affairs administration* (4th ed., pp. 267–286). John Wiley & Sons.

Peltonen, J. A., Veikkala, J., Rautio, P., Haverinen, K., & Pyhältö, K. (2017). Doctoral students' social support profiles and their relationship to burnout, drop-out intentions, and time to candidacy. *International Journal of Doctoral Studies*, *12*, 157–173. https://doi.org/10.28945/3792

Petrease-Felder, P., Stevenson, H. C., & Gasman, M. (2014). Understanding race in doctoral student socialization. *International Journal of Doctoral Studies*, *9*, 21–42. https://doi.org/10.28945/1947

Roach, M., & Sauermann, H. (2017). The declining interest in an academic career. *PLoS ONE*, *12*(9). https://doi.org/10.1371/journal. pone.0184130

Saleh, A., & Bista, K. (2017). Examining factors impacting online survey response rates in educational research: Perceptions of graduate students. *Journal of MultiDisciplinary Evaluation*, *13*(29), 63–74. https://journals.sfu.ca/jmde/index.php/jmde_1/article/view/487

Sallee, M. W. (2011). Performing masculinity: Considering gender in doctoral student socialization. *The Journal of Higher Education*, *82*(2), 187–216. https://doi.org/10.1353/jhe.2011.0007

Sarikaya, E. E., McAlpine, L., & Amundsen, C. (2017). Doctoral students' experiences of feeling (or not) like an academic. *International Journal of Doctoral Studies*, *12*, 73–90. https://doi.org/10.28945/3727

Shera, W. (2003). Ideas in action: Doctoral social work education in Canada: History, current status and future challenges. *Social Work Education*, *22*(6), 603–610. https://doi.org/10.1080/0261547032000142706

Smart, J. C., Feldman, K. A., & Ethington, C. A. (2000). *Academic disciplines: Holland's theory and the study of college students and faculty*. Vanderbilt University Press.

Smith, P. R. (2000). A meeting of cultures: Part-time students in an Ed.D. program. *International Journal of Leadership in Education*, *3*(4), 359–380. https://doi.org/10.1080/136031200750035978

Stephan, P. E. (2012). *How economics shapes science*. Harvard University Press.

Sverdlik, A., Hall, N. C., McAlpine, L., & Hubbard, K. (2018). The PhD experience: A review of the factors influencing doctoral students' completion, achievement, and well-being. *International Journal of Doctoral Studies*, *13*, 361–388. https://doi.org/10.28945/4113

Syverson, P. D. (1999). Part-time study plus full-time employment: The new way to go to graduate school. *Education Statistics Quarterly*, *1*(3), 13–15.

Tamburri, R. (2013, February 6). The PhD is in need of revision. *University Affairs*. https://www.universityaffairs.ca/features/feature-article/the-phd-is-in-need-of-revision/

Thomas-Long, R. (2007). *The politics of exclusion: An examination of graduate student funding experience in Ontario* [Unpublished doctoral dissertation]. Ontario Institute for Studies in Education, University of Toronto.

Viberg, O., Hatakka, M., Bälter, O., & Mavroudi, A. (2018). The current landscape of learning analytics in higher education. *Computers in Human Behavior*, *89*, 98–110. https://doi.org/10.1016/j.chb.2018.07.027

Walder, A. M. (2017). Pedagogical innovation in Canadian higher education: Professors' perspectives on its effects on teaching and learning. *Studies in Educational Evaluation*, *54*, 71–82. https://doi.org/10.1016/j.stueduc.2016.11.001

Walker, G. E., Golde, C. M., Jones, L., Conklin Bueschel, A., & Hutchings, P. (2008). *The formation of scholars: Rethinking doctoral education for the twenty-first century*. Jossey-Bass.

Watts, J. H. (2008). Challenges of supervising part-time PhD students: Towards student-centred practice. *Teaching in Higher Education*, *13*(3), 369–373. https://doi.org/10.1080/13562510802045402

Weidman, J. C. (1989). Undergraduate socialization: A conceptual approach. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. V, pp. 289–322). Agathon Press.

Weidman, J. C., & Stein, E. L. (2003). The socialization of doctoral students to academic norms. *Research in Higher Education*, *44*(6), 641–656. https://doi.org/10.1023/A:1026123508335

Weidman, J. C., Twale, D. J., & Stein, E. L. (2001). Socialization of graduate and professional students in higher education: A perilous passage? *ASHE-ERIC Higher Education Report*, *28*(3). https://eric.ed.gov/?id=ED457710

Wladkowski, S. P., & Mirick, R. G. (2019). Mentorship in doctoral education for pregnant and newly parenting doctoral students. *Journal of Women and Gender in Higher Education*, *12*(3), 299–318. https://doi.org/10.1080/26379112.2019.1654394

Wood, M. J. (2005). Comparison of doctoral programs: The United States, the United Kingdom, and Canada. *Clinical Nursing Research*, *14*(1), 3–10. https://doi.org/10.1177/1054773804272759

Woolston, C. (2019). PhDs: The tortuous truth. *Nature*, *575*(7782), 403–406. https://doi.org/10.1038/d41586-019-03459-7

Wurdinger, S., & Allison, P. (2017). Faculty perceptions and use of experiential learning in higher education. *Journal of E-Learning and Knowledge Society*, *13*(1), 15–26. https://doi.org/10.20368/1971-8829/1309