

A CONCEPTUAL FRAMEWORK FOR RESEARCH AT CANADIAN COLLEGES*



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With the advent of the post-industrial 21st century knowledge-based economy, Canada's colleges are under increased pressure to extend their historical mandates of employment-related education and regional economic development by incorporating research, especially applied research, into their traditional programs. The recent dramatic growth of college research cultures in response to these pressures, however, is occurring in an unsystematic and uncoordinated manner. The purpose of this paper is to propose a comprehensive, integrated framework that could provide clarity, focus, and direction for building a productive and sustainable research culture at Canadian colleges. An analysis of research models in higher education was conducted, leading to a working model that was used as a lens to analyze the implications of building a research culture specifically adapted for Canadian colleges. The six attributes of the working model (purpose, forms, governance, personnel, funding, and output) were revised accordingly, and a conceptual framework was proposed that could reflect and accommodate the unique circumstances in which research is evolving at Canadian colleges.

INTRODUCTION

A metamorphosis of mandates and missions is currently unfolding on college campuses across Canada¹. With the advent of the post-industrial 21st century knowledge-based economy, and in response to federal initiatives to expand applied research and innovation activities in publicly funded institutions of higher learning, many Canadian colleges are now actively incorporating research cultures into their traditional dual mandates of employment-related education and regional economic development.

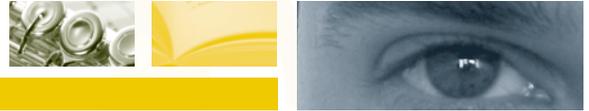
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¹ For the purpose of this article, "college" is used as an omnibus term representing the wide range and diversity of publicly funded *non-university* postsecondary institutions in Canada. In practice, these institutions are variously referred to as: community colleges, colleges of applied arts and technology, technical institutes, university-colleges, institutes of technology and advanced learning, polytechnic institutes, and, in Quebec, *collèges d'enseignement général et professionnel* (CEGEPs).

Just as federal initiatives of the 1960s, in the form of enabling legislation and capital assistance for the establishment of a pan-Canadian system of community colleges, were designed to accelerate Canada's transition from a resource-based to an industrial-based economy, so too the current federal involvement with college missions is driven by the need to accelerate the evolution of a national knowledge-based economy in a globally competitive marketplace (Industry Canada, 2007; Ivany, 2000). The potential contribution of Canada's colleges to the national innovation agenda has now emerged as "one of the top advocacy priorities for the college system" (Corkery, 2002, p. 1).

However, while the rhetoric accompanying this metamorphosis of missions is often stirring, questions remain as to the extent to which Canadian colleges are, in fact, ready, willing, and able to fulfill the goals of this ambitious new research agenda. Several recent studies that examined the current research capacity of colleges were guarded in their conclusions (Bélanger, 2005; Corkery, 2002; Madder, 2005). Therefore, although Canadian colleges are on the verge of transformative changes, an unambiguous picture of their capacity to participate meaningfully in the national research and innovation agenda has not yet emerged.

Beginning in 2006, I embarked upon two national studies designed to address this gap in knowledge by exploring the extent to which colleges were positioned to participate significantly in this new national research agenda. Through *Faculty Participation in Research at Canadian Colleges: A National Survey* (Fisher, 2008a), I conducted the first large-scale pan-Canadian (bilingual) survey of college faculty (2,410 participants) in order to investigate current levels of college faculty participation in research activities, and to identify their preferred areas of research interest. Subsequently, I was commissioned by the Higher Education Research and Development Policy Directorate of Industry Canada to conduct a comprehensive pan-Canadian assessment of the role that colleges were playing in the overall innovation spectrum, and the extent to which their capacity was being fully utilized. Published as *The College Advantage: Private Sector Innovation and Highly Qualified Personnel* (Fisher, 2008b), this state-of-the-field report illustrated the form, nature, structure, and scope of current research capacity and innovation activities occurring at Canadian colleges.



Based on the findings of these and other studies, it became evident that, while levels of research interest and examples of research activities were expanding significantly at colleges across the nation, this growth was occurring in an unsystematic and uncoordinated manner. This situation was further complicated by the scale of differentiation in terms of provincial legislation, collective agreements, funding guidelines, areas of specialization, and so forth. In particular, there was no established tradition, no clear organizational structure, no prevailing vision, and no coherent framework to guide the development of an effective and productive national research culture at Canadian colleges.

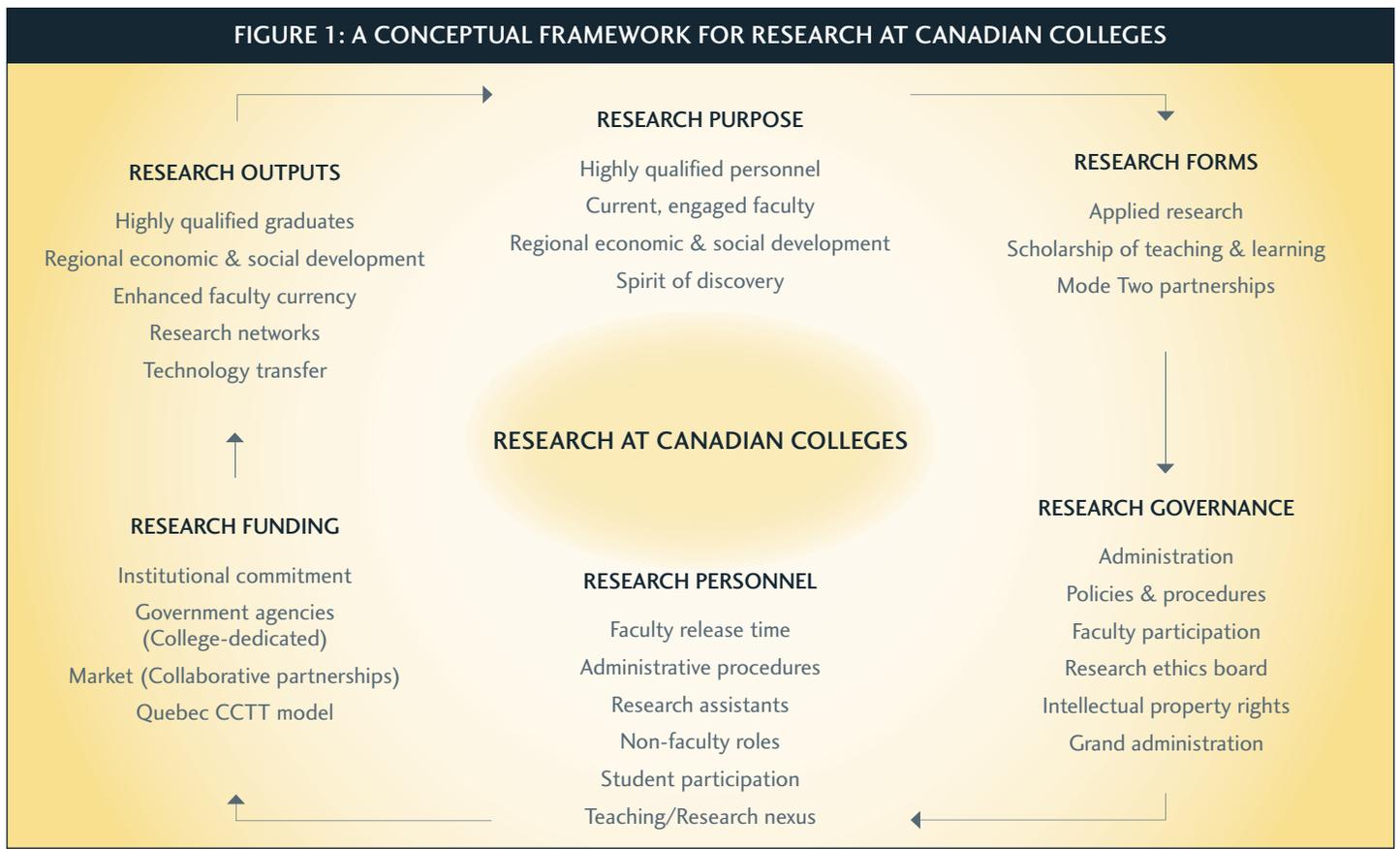
The six key constructs include: purpose, forms, governance, personnel, funding, and outputs.

To address this gap in knowledge, I completed in 2009 a doctoral thesis that proposed a comprehensive, integrated framework that could provide clarity, focus, and direction for the further development of a robust and sustainable research

culture at Canadian colleges. The central research question guiding my thesis was: What might be the best model for building a coordinated, effective national research culture, tailored specifically for Canadian colleges? This paper represents a summary of that thesis.

Based on a wide-ranging and comprehensive reading in the field, on discussions and communications with relevant participants, and on perceptions, analyses, and understanding of the topic, six categorical constructs were selected which were deemed to represent all of the significant themes, models, issues, and factors described in the literature. The six key constructs include: purpose, forms, governance, personnel, funding, and outputs.

Each of the six constructs in the working model was used as a lens for exploring the implications of incorporating research into college mandates. The working model was then tailored to accommodate the unique challenges, opportunities, and circumstances of research at Canadian colleges. Figure 1 provides a schematic representation of the final conceptual framework.





▶ A CONCEPTUAL FRAMEWORK FOR RESEARCH AT CANADIAN COLLEGES

In this section the six constructs comprising the framework, their attributes as well as their implications for research at Canadian colleges, are presented in further detail.

RESEARCH PURPOSE

The primary purpose of incorporating research into college mandates is to enhance and extend the traditional core missions of colleges (employment-related education and regional economic development) by enriching the student experience and the quality of the preparation of college graduates, by keeping faculty current and engaged in their fields of expertise, and by contributing to the social and economic well being of the communities they serve. In this light, research must be recognized and pursued as an extension of, rather than a diversion from, the core college missions.

In terms of enhancing student learning, research activities provide contemporary college students real world challenges, hands-on experience with leading-edge technologies, and advanced training in specialized skills. Research activities also expose students to the higher order thinking skills increasingly required in the new knowledge-based economy. One fundamental characteristic of the new economy is that it not only “creates new job categories requiring unique skill sets, but it also drives up the knowledge intensity of existing occupations” (Ivany, 2000, p. 11). Consequently, college graduates who have participated in research and scholarship activities should be more highly qualified than previous graduates to contribute to the social and economic well-being of their communities.

Furthermore, collaborative research activities with regional businesses and industries expand the opportunities for college faculty to augment their currency in their areas of professional expertise. As one participant in the national faculty survey noted, integrating research into classroom activities provides:

[...] a three-way benefit: students, community, and me. When I see the students share my excitement over new knowledge it is so gratifying. When I see the community benefit from the work my students and I accomplish, it is amazing (in Fisher, 2008a).

When the purpose is to enhance and extend the traditional core mission, incorporating research into college programs can generate energy, enthusiasm, and fruitful outcomes for all stakeholders.

RESEARCH FORMS

In the context of Canadian colleges, which for the most part lack the tradition of basic research so embedded in the university environment, the emphasis shifts primarily toward non-traditional, emergent forms of research such as applied research and research related to teaching and learning. In this context, certain aspects of Boyer’s (1990) and Gibbons’ (2003) models seem particularly well suited for developing a robust research culture at Canadian colleges.

Any form of research or scholarship that contributes to improvements in learning, such as Boyer’s (1990) *Scholarship of Teaching*, complements the fundamental goals of Canadian colleges to the betterment of their students and their communities. In recent years, an entire field of educational research, often referred to as the *Scholarship of Teaching and Learning* (Herteis, 2010), has focused on improving the quality and effectiveness of teaching practices at Canadian colleges (Ferguson, 2005; Fisher & Engemann, 2009; Lowry & Froese, 2001).

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Another component of Boyer’s (1990) model, the *scholarship of application*, also appears particularly pertinent and applicable to Canadian colleges. Boyer suggested that “scholarship has to prove its worth not on its own terms, but by service to the nation and the world” (p. 23), and this form of knowledge application, commonly referred to as *applied research*, represents a natural extension of college mandates. Gibbons’ (2003) has described a closely related form which he refers to as *Mode Two* research. Gibbons’ Mode Two research is characterized by collaborative partnerships and professional linkages organized around particular problems and applications. Gibbons’ model is relevant to our emerging conceptual framework because it reflects the unique characteristics of colleges, and extends the scope of research to “a wider, more temporary and heterogeneous set of practitioners, collaborating on a problem defined in a specific and localized context” (p. 110).

RESEARCH GOVERNANCE

This construct relates primarily to the manner in which a research system is structured, how and by whom it is organized, the role and makeup of advisory boards, as well as the establishment of appropriate institutional policies and procedures. In the context of Canadian colleges, engagement with granting councils and funding agencies has been instrumental



in accelerating the establishment of research offices and implementation of research-related policies (Corkery, 2002; Fisher, 2008b; Madder, 2005; NSERC, 2007).

Colleges engaging in research must develop and implement rigorous governance policies and procedures related to, among others things, ethics, academic freedom, research integrity, conflict of interest, and peer review processes. Policies regarding Intellectual Property rights must also be carefully delineated, especially in the context of collaborative projects with corporate partners, and must accommodate and synthesize the commercial needs of corporate partners, the economic goals of funding agencies, the instructional objectives of the college, and the rights, academic, remunerative, and otherwise, of faculty researchers. Clear policies also must be developed to facilitate the administration of grants from external funding agencies within the parameters of established financial, accounting, and human resources departments not historically structured for such contingencies. Finally, colleges should consider including faculty researchers as members of governing bodies, and fostering their participation at all stages of the research enterprise. In summary, governance should fulfill a developmental function in creating a research culture in which research “comes to be viewed as an integral component” (Rowley, 1999, p. 3) of the college mission.

RESEARCH PERSONNEL

This construct, which focuses primarily on the human resource aspects related to employment opportunities, recruitment practices, terms of employment, promotion and tenure, incentives, status, workloads, etc., highlights many unresolved issues in the context of Canadian colleges. For example, colleges face distinctly different challenges than universities with respect to faculty employment arrangements related to research. College faculty are employed as full time *teachers*, with no expectation, remuneration, employment, tenure, or promotion specifically related to research activities. Provincially negotiated collective agreements are predominantly silent on this issue, while at the local (college) level, allocation of ever-scarcer resources for internally funded research is a challenge for even the most committed institutions. Corkery (2002), Fisher (2008b), and Madder (2005) all identified the lack of faculty release time as the primary limiting factor in the evolution of research cultures at Canadian colleges. Resolution of this issue will require a concerted effort by advocates and strategic decision makers at all levels to re-negotiate workload models and collective agreements in order to recognize, incorporate, and fund research and scholarship as legitimate (though voluntary) activities for faculty at Canadian colleges.

In addition, the construct of research personnel also relates to policies and procedures regarding non-faculty participants (part-time employees, support staff, etc.) engaged as Research Assistants or in other research-related roles (such as Technology Transfer or Industrial Liaison Officers) within the established parameters and constraints related to current collective agreements, job descriptions, pay scales, and so forth. Considering the purpose of college research in producing highly qualified graduates for the 21st century knowledge economy, opportunities should also be developed for college students to assume roles as Research Assistants.

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RESEARCH FUNDING

Neave (2002) described three traditional “money streams” (p. 13) that support and influence research in higher education – Institution, Government, and Market. Colleges are at a severe disadvantage in at least two of Neave’s money streams, namely, institutional and governmental research funding.

With respect to institutional support, colleges receive negligible support in provincial operating grants to pursue research activities, and, therefore, those colleges that allocate scarce internal resources to research and scholarship, do so at a cost to other programs and activities. With regard to the second money stream (government), colleges are again at a disadvantage in their limited access to research funding from competitive sources such as granting councils; Fisher (2008b) found that less than 1% of CFI (Canada Foundation for Innovation) research grants and less than one-half of 1% of NSERC (National Science and Engineering Research Council) research grants had been awarded to colleges. Nationally, regionally, and provincially, Canada’s colleges are constrained in the growth of their applied research and innovation activities by systemic bias in favour of universities, a situation perpetuated by the perception that “universities have a proprietary and unassailable role” (Bélanger, 2005, p. 36) in the research establishment. It should be noted, however, that in the Province of Quebec considerable funding is allocated each year to support research activities through operating grants to centres collégiaux de transfert de technologie (CCTTs), discussed below.

As to Neave’s (2002) third money stream, sale of services, colleges are naturally engaged in providing employment-related training, technical support, and applied research services to



support regional economic development, and, therefore, appear ideally suited to benefit through their close association with business and industry, especially with Small-to-Medium-size Enterprises (SMEs).

Improvements in institutional and governmental support of research at colleges will require deliberate and concerted advocacy by stakeholders at all levels to achieve the necessary revisions to granting council eligibility criteria, provincial funding formulas, collective agreements, and local (college) strategic plans. One example of the successful impact of such advocacy is NSERC's college-dedicated College and Community Innovation (CCI) program. The objective of this program is to increase innovation at the community and/or regional level by enabling Canadian colleges to increase their capacity to work with local companies, particularly SMEs. To date, the NSERC-CCI program has awarded 65 million dollars to 34 institutions for college-based research, thereby establishing a long-term, sustainable base dedicated to assisting colleges in contributing more effectively to the national research and innovation agenda.

Revisions to provincial operating grants could similarly assist in unleashing the full potential of college research capacity. With respect to research funding drawn primarily from market sources, colleges already have a well-established tradition of collaborative arrangements with businesses and industries to provide specialized skill training, consulting, and applied research services. In particular, Québec's CCTTs (College Centres for Technology Transfer) provide a successful example of the benefits that can accrue through coordinated, multi-dimensional arrangements involving a spectrum of stakeholders and funders.

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RESEARCH OUTPUT

While traditional indicators of research output in higher education primarily reflect measures such as the number and quality of faculty publications, public and private research dollars, and faculty awards, college faculty have neither a time component in their workload formula nor any explicit expectation to realize such outputs. However, with respect to the growing legitimacy of non-traditional measures of

research activity, indicators related to technology transfer and network participation seem well suited to reflect college research activities (Gibbons, 2003; Province of Quebec, 2005; UNESCO, 2006).

Additionally, innovative measures related to student performance and research training are increasingly relevant at contemporary colleges (Neave, 2002; Rowley, 1999). Since the primary purpose of college research includes the training of highly qualified personnel who are well equipped to contribute productively in the new knowledge economy, the inclusion of enhanced student skills can be a relevant and critical indicator of research output at Canadian colleges. Also, colleges can measure the extent to which research is integrated into the curriculum, the number of learning objectives met through increased project-based delivery, the extent of student exposure to and involvement in real-world applications of instructional knowledge, contributions to innovative designs and applications, feedback from employers, and the number of graduates in the workforce using research-related skills.

In addition, the economic impact of college research can be measured through indicators of client satisfaction, increased corporate sales, productivity, marketability, and new employment, or through technology transfer measures such as patent applications, patent awards, equity partnerships, spin-off companies, royalties, and licenses. Faculty participation in collaborative networks, linkages, and alliances represent other college-appropriate indicators of research output.

In all of these areas, significant strides have been taken by Canada's colleges to enhance accountability by developing college-appropriate sets of measures and performance indicators of research outputs (Fisher, 2008b; Madder, 2005; NSERC, 2007; Polytechnics Canada, 2007). However, the plethora of indicators arising from these various metrics and models must now be amalgamated into a more manageable and cohesive set of measures to gauge the quality as well as the extent of research output at Canadian colleges.

CONCLUSION

In summary, the proposed Conceptual Framework for Research at Canadian Colleges deploys the six constructs comprising the working model of research in higher education, but tailors their attributes specifically in the context of the college environment. The proposed framework will, hopefully, provide coherence, clarity, and focus for discussions about the emerging research enterprise, bring increasing consensus and shared direction among stakeholders both within the



college community and within the larger communities they serve, and, ultimately, enable us to chart more clearly the future dimensions and directions of the research cultures emerging on contemporary Canadian college campuses.

While the adoption of this conceptual framework can contribute to a more coherent and systematized approach to research within the college context, it also raises questions in terms of the potential impact of incorporating research into college environments. Those colleges that choose to participate in the college research agenda must consider the implications of implementing an integrated research model, especially in terms of the requisite shifts in strategic plans, allocations of resources, modifications in collective agreements, changes in faculty expectations and workloads, and other impacts.

The findings of this study also suggest the potential of Quebec's unique model of CCTTs as an area for further study. For example, in the national NSERC-CCI grant program to support college research activities, 12 cégep-related CCTTs in the Province of Quebec have won over 25 million dollars, representing approximately 40% of total CCI funds awarded for research at colleges across Canada. The reasons behind the success of Quebec's CCTTs in federal grant competitions, the collaborative funding model that supports college research in Quebec, and the potential applicability of this model as a template for college research in other provinces, all merit further study.

Canada's prosperity in the 21st century will depend increasingly on our ability to innovate, and colleges "can contribute to this prosperity, not by changing our mission, but by adhering to our founding principles and revitalizing our approaches" (Ivany, 2000, p. 13). This transformation poses significant challenges to Canada's unique college system; consequently, the purpose of this article has been to contribute to this evolution of college missions by synthesizing and systematizing the existing bodies of knowledge on this topic into an integrated framework.

While this conceptual framework is tentative and exploratory, and while the preceding conclusions are to be viewed with some caution, nevertheless, it is hoped that this model will

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initiate a new conversation and contribute to theory development, further research, and improved practice. To that end, this proposed framework invites and challenges all stakeholders to participate in further delineating the emerging landscape of research at Canadian colleges. ●

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