Health Informatics Education in Canada – What's Ahead?

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ABSTRACT
With the growing recognition that there is a severe shortage of qualified health informatics experts who can understand, manage and use information and communication technologies in health settings, there is an urgent need to advance health informatics education and training in Canada. Given this rising demand, it makes sense to pool together the limited resources available to create a health informatics learning community. A consortium of educational institutions, health organizations, professional associations, government ministries and the private sector could build up a critical mass of qualified health informatics experts, develop online health informatics content and create flexible programs that could be easily accessible from multiple institutions for learners with different learning needs across the country. This article looks at what's ahead with health informatics education opportunities in Canada over the next few years.

WHAT IS HEALTH INFORMATICS?

Health informatics (HI) is about the understanding, use and management of health information. Since much of this information is in electronic form, HI is also about the planning, design, implementation, use and evaluation of information and communication technologies (ICT) in health settings. Because health information and ICT have become pervasive in organizations, HI is as much about the interpretation, communication and change of organizational practices and cultures. Even though HI has emerged as a distinct field of study since the 1970s in Europe and the United States, it was not widely recognized in Canada in the early years. Up until recently, the School of Health Information Science at the University of Victoria has been the only school in Canada that offers a comprehensive formal HI education program. With the current surge of interest in such areas as the electronic health record and health information for consumers, suddenly HI is catching everyone's attention across the country. This paper provides a glimpse

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THE GROWING NEED FOR HI

In 1997, the National Health Forum reported the need to establish coordinated health information systems, and the importance of health information in enhancing decision-making for health professionals. Having relevant health information at the right place, at the right time to the right people through the use of advanced ICT has become crucial to realizing this new vision of health in Canada. As a testament to this new thinking, the Canadian government has invested heavily in ICT through such recent initiatives as the Canadian Health Infostructure Partnership Program (CHIPP) and the newly established Canada Health Infoway Inc. The intent of these efforts is to greatly enhance the implementation and uptake of electronic health records, telehealth applications and health information for the public.

A recent survey of 45 health organizations, conducted by the University of Victoria, revealed that 59% of health organizations had one or more HI/ICT job vacancies, 83% expected further increase in HI/ICT positions, 66% had difficulty recruiting/retaining HI/ICT staff and 52% would pay for HI training for their staff. Another survey of 224 attendees in a plenary session on future HI education at the e-Health 2001 Conference in Toronto revealed 94% of respondents agreed there is currently a need for HI education that is unmet; 75% expressed interest to participate in professional development in HI; 24% would like to enrol in undergraduate HI programs; 43% in MSc programs and 18% in PhD/post-doctoral programs, if these were available right now.

There is now a growing recognition of the severe shortage of qualified HI experts and users who can understand, manage and use these sophisticated ICT and health information technologies that will become ubiquitous in health organizations over the next few years. Some HI education programs and courses are currently available in Canada through such institutions as the University of Victoria and BC Institute of Technology. However, there lacks a concerted effort to provide readily accessible online HI education programs and content that can address the growing HI needs of health professionals in the workplace. At the same time, while several other institutions are now entering the HI education market, they have quickly found that there are few formally trained HI experts in Canada. This severely limits their ability to provide a comprehensive HI education program within a single institution. There is also insufficient funding available within most institutions to convert their HI curriculum into online learning programs that are readily accessible using the latest instructional technologies. What is needed is a consortium approach to build up a critical mass of qualified HI experts, online HI content and flexible programs that can be easily accessible from multiple institutions for learners with different learning needs across the country.

EXISTING HI-RELATED PROGRAMS

Currently, there are a number of post-secondary educational institutions that offer or are planning to offer health informatics programs at the professional development, certificate/diploma, undergraduate and graduate levels. Table 1 provides an overview of these institutions and the types of programs offered. Note that the graduate programs listed under the Universities of Dalhousie and Waterloo are MSc/PhD degrees in computer science with specialization in health informatics, whereas

under the University of Calgary it is a PhD degree in health research with specialization in telehealth. The Canadian Organization for Advancement of Computers in Health (COACH) is also planning to introduce a series of professional development workshops in e-health. The BC Institute of Technology is currently the only institution that is offering an Internet-based HI certificate program.

Table 2 provides a further breakdown of the type of program and mode of delivery offered by these institutions.

At present, there are also five institutions/organizations in Canada that offer 2-year health information management/service diploma programs approved by the Canadian Health Records Association. These institutions are Douglas College, George Brown College, the

TABLE 1: Types of HI-Related Programs in Canada

Institution	Professional Development	Certificate/ Diploma	Undergrad	Graduate
BC Institute of Technology		X		
COACH e-health series	Planned			
Dalhousie University				X
University of Calgary				X
University of Shebrooke		Planned		Planned
University of Victoria	X		X	X
University of Waterloo		X		X
York University		X	X	

TABLE 2: Program Type and Mode of Delivery at Canadian Institutions

Institution	Type of Program	Delivery
	Certificate/Diploma	
BC Institute of Technology	Certificate in Health IS Technology, Certificate in Health Technology Management	Distance format, online
York University	Certificate in HI for nurses with degrees Professional Development	Part-time, face-to-face
University of Victoria	Professional development program	Face-to-face, one-week
University of Waterloo	Professional development program	First course in 2001, Part-time, distance format
	Undergraduate Degree	
University of Victoria	BSc in HI with 4 co-op work terms	Full-time, face-to-face.
York University	BSc in health studies with a major in HI BA in IT with option in HI	First course in fall 2001, Full-time, face-to-face
	Graduate Degree	
Sherbrooke University	Graduate diploma and degree planned in HI	Mixed delivery modes
University of Dalhousie	MSc/PhD in computer science with specialization in HI	Full-time, face-to-face
University of Victoria	MSc/PhD studies by special arrangement; new MSc being formalized planned	Full-time, face-to-face; flexible delivery
University of Waterloo	MSc/PhD in computer science with specialization in HI	Full-time, face-to-face
University of Calgary	MSc/PhD in health research with specialization in telehealth	Full-time, face-to-face

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Canadian Healthcare Association, Saskatchewan Institute of Applied Sciences and Technology Wascana Campus, and Red River College. Recently, the Canadian Health Records Association partnered with Ryerson Polytechnic University and the Universities of Victoria, Western Ontario and Dalhousie to offer a 4-year bachelor degree in health information management. The association intends to move toward a 4-year degree program certification.

THE CANADIAN SCHOOL OF HEALTH INFORMATICS

Given the rising demand for HI education and the lack of HI specialists across Canada, it makes sense to pool the limited resources available to create a critical mass of HI learning community. This is why the concept of a Canadian School of Health Informatics was born. The Canadian School of Health Informatics is not a physical institution to offer yet another HI education program. Rather, it is a virtual entity made up of a consortium of educational institutions, health organizations, professional associations, government ministries and the private sector as stakeholders working in collaboration to address the need for HI education through existing and emerging resources.

The vision of this proposed Canadian School of Health Informatics is "to unify our diverse institutional program offerings into a coherent, national infrastructure for lifelong learning that can be accessed by individual learners in all three streams of health informatics – practice, education and research – from anywhere in Canada and beyond." The idea behind this national school concept is to build on HI programs that are already in place to avoid duplication in course offerings, share HI experts and courses among institutions, and collaborate on joint research projects. Stakeholders such as the health regions and professional associations will play an important role in this consortium by helping to refine the HI education and research agenda to ensure its relevance and impact on the health sector as a whole. In many cases, stakeholders will be consumers of the Canadian School of Health Informatics by enrolling their employees in affiliated programs and benefiting from the HI experts/users produced. Learners can enroll in a program that meets their needs from one of the participating educational institutions; they will be able to take courses, work with instructors/mentors, and take part in projects from other member institutions. Regular education workshops, symposiums and retreats will be held to bring learners and consortium members together to share knowledge, exchange ideas and discuss initiatives to advance the field of HI.

A PROPOSED SCENARIO

Canadian School of Health Informatics Model

This proposed model promotes lifelong learning in HI with both an academic research/education and a professional practice orientation through different types of learning programs from participating institutions. This model is illustrated in Figure 1.

FIGURE 1: Health Informatics in Canada

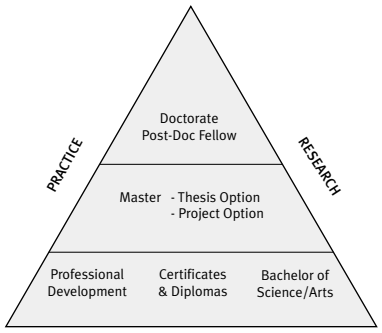
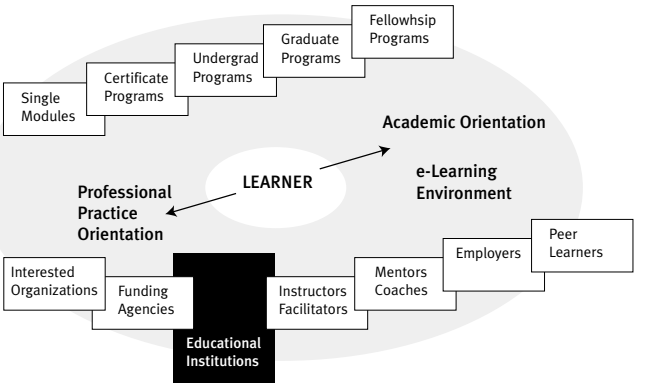


FIGURE 2: Workplace Setting



- Health informatics in Canada is viewed holistically through the integration of lifelong learning, research and practice.
- The range of programs begins with individual courses for professional development; this is followed by more intensive certificate/diploma programs to produce knowledgeable HI users.
- For those interested in a career in HI, there is further intensive training leading to a bachelor degree in HI. Additional advanced training is available through either thesis or project option at the master degree level, which produce HI specialists qualified as CIOs, IS directors and managers in practice settings, as well as HI researchers and educators in academic settings.
- Doctoral/post-doctoral training is available for those wishing to establish an academic career in HI education and research, or to become an HI expert in practice settings.
- An important feature is the interconnectedness of these programs. Each education level can become a feeder to the next, thus providing an ongoing opportunity for HI retooling and lifelong learning as needed.

Learning Approach

The approach being advocated is experiential learning situated within the workplace setting, where the learner plays an active role in pursuing his/her learning goals and outcomes, often with the help of their employers. This learning approach is illustrated in Figure 2.

- The learner is at the centre of the learning environment, thus responsible for his/her HI learning goals, objectives and outcomes.
- A consortium approach is needed where educational institutions, funding agencies, employers and interested organizations work together to provide a nurturing e-learning environment for learning through a rich set of resources, such as information, projects, expertise and financial support.
- An Internet-based e-learning environment is provided to ensure an interactive virtual network where learners can seek mentorship, coaching, consultation, facilitation, peer support and collaboration from consortium members as part of learning.
- Different learning programs with varying levels of intellectual challenges and transferability are available for the learner to view these programs as lifelong learning opportunities that span institutional boundaries.
- The learner has the option of choosing an academic or a professional practice orientation as his/her career focus. An academic orientation typically prepares the learner to become an educator and/or researcher, while a professional practice orientation prepares the learner to be a HI user, expert and/or leader in workplace settings.

WHAT ARE THE NEXT STEPS?

Over the past few months, a group of stakeholders has been putting together grant proposals to funding agencies to move the Canadian School of Health Informatics agenda forward. Examples are:

- The Office of Health and the Information Highway proposal by the University of Victoria, HEALNet, COACH and iW Technologies Inc. to develop policy recommendations for ICT education and training in Canada.

- The Office of Learning Technologies proposal to build capacity in HI for professionals in health settings through a flexible MSc program by the Universities of British Columbia, Victoria, Alberta and Calgary.
- The Canadian Network for the Advancement of Research, Industry and Education (CANARIE) e-learning proposal to build a pan-Canadian HI Collaboratory with learning resources and tools through the BC Institute of Technology, HEALNet, COACH, the Canadian Health Records Association (CHRA), the Michener Institute for Applied Health Sciences, George Brown College, and the Universities of Victoria, Alberta, Calgary, Western Ontario, Sherbrooke, Memorial, Dalhousie and Waterloo.
- The Canadian Institutes for Health Research PhD/post-doc training program in HI through the Universities of Victoria, Calgary, McMaster, McGill, Waterloo, Dalhousie and Sherbrooke.

We do not expect all of these initiatives will be funded, but the application process has brought these organizations together in a way that has never been done before. The group is now working toward a formal consortium in order to establish a national forum to address HI education and training issues for Canada.

For health organizations, professional associations, government ministries, funding agencies and the private sector wishing to be involved with this emerging consortium, the first step is to get involved by participating in one or more of the initiatives that have been described. For instance, you could help identify the types of HI expertise, knowledge and skills that are needed, the roles that your organization can play in the consortium, and the specific resources you can contribute to move the agenda forward. As learners, you can determine what type and level of HI education you need, contact one of the consortium members to express your interest, and actively take part in the various HI programs and courses as they become available. The only way we can build capacity in health informatics for professionals in health is to work together to raise the awareness among health organizations, professional associations, educational institutions, government ministries, funding agencies and the private sector of this urgent need to advance HI education and training in Canada. e

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The take-away

There is no one-size-fits-all answer for all companies in all situations. But by more thoroughly thinking through the level and nature of the residual uncertainty facing decision-makers, strategists can define feasible alternatives and make better-informed choices to shape or adapt.

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