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Abstract

Objectives: Canada and Australia share two priority areas for HI workforce capacity building: to support research and education. This presentation will discuss a collaborative, nationwide health informatics (HI) PhD/Postdoc training program in Canada, which demonstrates a potential solution to meet these priorities. The status of HI higher education in Australia is briefly reviewed. The potential solution in resolving workforce shortage in Australia through adopting overseas practice is discussed, such as implementing a similar collaborative HI research training program across the country. Background: A Think Tank organized by Commonwealth Department of Health and Ageing in 2003 explored the issue of HI workforce capacity building and identified a list of priorities for action. These included support for research and education. One proposed strategy for addressing research support was to: "Fund the formation of a virtual collective of researchers." Proposed strategies for enhancing education included: "exploring the potential of collaboration between universities for efficiency gains." This paper discusses how to move the agenda forward based on case study of a similar Canadian initiative for addressing similar issues. Methods: A comparative case study approach was taken that integrated a literature research, which identified the importance of support for research and education in HI workforce capacity building in Australia, document review, interview of key informants and observation of project progress. Results and Implications: In response to the national need for solutions to HI research and education capacity building, this paper explored the possibility of introducing a program similar to a nationally funded Canadian project with eight universities that established a collaborative HI PhD/Postdoc research training program. However, the education system in Australia is different from that of Canada. Substantial strategic and tactical issues remain to be solved before such an initiative could move forward. Despite the challenges, Canadians have demonstrated that such an initiative can succeed and play a vital role in enhancing HI research and education capacity nationwide.

Keywords

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A Collaborative Approach to Health Informatics Capacity Building – Learning from Canadian Practice in Fostering Research and Education

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Abstract

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Background: A Think Tank organized by Commonwealth Department of Health and Ageing in 2003 explored the issue of HI workforce capacity building and identified a list of priorities for action. These included support for research and education. One proposed strategy for addressing research support was to: “Fund the formation of a virtual collective of researchers.” Proposed strategies for enhancing education included: “exploring the potential of collaboration between universities for efficiency gains.” This paper discusses how to move the agenda forward based on case study of a similar Canadian initiative for addressing similar issues.

Methods: A comparative case study approach was taken that integrated a literature research, which identified the importance of support for research and education in HI workforce capacity building in Australia, document review, interview of key informants and observation of project progress.

Results and Implications: In response to the national need for solutions to HI research and education capacity building, this paper explored the possibility of introducing a program similar to a nationally funded Canadian project with eight universities that established a collaborative HI PhD/Postdoc research training program. However, the education system in Australia is different from that of Canada. Substantial strategic and tactical issues remain to be solved before such an initiative could move forward. Despite the challenges, Canadians have demonstrated that such an initiative can succeed and play a vital role in enhancing HI research and education capacity nationwide.

Background: A skilled workforce is essential for ensuring the successful introduction of sophisticated information systems such as *HealthConnect* and *MediConnect*. Commonwealth Department of Health and Ageing conducted a Think Tank in 2003 to explore the issue of health informatics (HI) workforce capacity building. The participants included representatives from the health and health information technology sectors, academia and government. The Think Tank identified key issues for workforce capacity building, priorities for these issues and possible strategies to address the issues [2]. The identified priorities for action included support for research and education.

One proposed strategy [2] to address support for research was to: “Fund the formation of a virtual collective of researchers.” Proposed strategies for enhancing education [2] included developing incentives to encourage health workers to undertake post-graduate education and training in health informatics and “explore the potential of collaboration between universities for efficiency gains

(including minimizing duplication of course offerings). It may also include the development of a web-based national repository of course materials.”

Similar to Australia, Canada has been and is continuously pursuing strategies and actions for building HI capacity in the country. The workforce capacity issue was raised in an e-Health Conference plenary in 2001 (the equivalent of HIC annual conference in Australia). Pan-Canadian HI Strategy Reports were endorsed in 2002 [3]. The strategies and actions for addressing research and educational capacities currently used in Canada are similar to those proposed by the Workforce Think Tank, yet Canadians have already put their strategies into practice. Canada’s experiences and lessons learned would be useful for Australian to consider when developing and implementing programs to address the research and educational demand for HI.

Methodology: A comparative case study approach was taken to thoroughly investigate and describe the HI capacity building strategies and opportunities in Australia and Canada. A literature research was performed, which identified the importance of support for research and education in HI workforce capacity building in Australia. On the Canadian side, the funding proposal for the CIHR national project was reviewed and salient points noted. In addition a number of documents related to HI training and research were also reviewed. The second and third authors are instrumental in the Canadian national project and contributed background information. The first author attended several web-based meetings of the project management committee.

Analysis consisted of comparing and contrasting the need for HI capacity building, suggested strategies as well as those currently in use, and challenges and benefits.

Results and Implications: Eight universities in Canada jointly provide a collaborative Health Informatics (HI) Research Training Program at the PhD/Postdoc advanced level. This program uniquely addresses the need for health informatics capacity building and strengthening collaboration among partner institutions. It is also building a sustainable virtual community that will be a key component of HI research, education and practice in Canada. The results of this paper focus on introducing this important, innovative initiative in Canada and lessons that can be translated into the Australian environment in order to advance HI research and education.

The Canadian Health Informatics PhD/Postdoc Training Program

CIHR Health Informatics PhD/Postdoc Strategic Training Program (CHPSTP) was funded primarily through a national funding agency, the Canadian Institutes of Health Research (CIHR). It was established in June 2002 with the funding granted for up to six years, subject to a satisfactory mid-term review during the third year. Partners in the program were encouraged to also seek provincial funding to support local students and 2 were successful.

Hebert and Francis [4] note that “the *overall aim* of the program is to increase research capacity in HI at the PhD/Postdoc level in Canada. The specific objectives are to:

- Offer research learning experiences to trainees that are not obtainable from local programs;
- Strengthen collaboration among partner institutions in HI education and research;
- Build a virtual community that is actively engaged in HI research, education and practice;
- Assume a leadership/facilitation role as a credible academic HI community in Canada.”

Program Overview: Twenty-four trainees began the first iteration of the program in January 2003 and continued their participation for 2 years. Four Research Learning Experiences (RLE’s) were offered through face-to-face workshops as well as web-based conferencing, a mixed mode of delivery that was believed to lead to the best learning outcome. A second class of 24 trainees began in January 2005, with a slightly different approach: 3 mini cohorts each focus on a particular HI subject area, including e-Health evaluation and policy; Primary Care Informatics and Knowledge

Management. The three themes are broad enough to give diverse HI research and development opportunities for trainees yet provide focus for learning activities. Two mentors from two partner institutions coordinate each cohort. They are responsible for organizing and facilitating specific research training activities for each mini-cohort.

Program Funding Support: Seventy percent of CIHR funding must be spent on student support. Each partner institution is provided with an equal amount of funding each year for CHPSTP related activities, including support of at least one trainee including his/her stipend and travel, as well as the administration/travel/communication expenses for the mentors. To secure continuous funding, each partner institution needs to submit a 1-page plan to outline its projected expenditures for the year. A small amount of funds is allocated for evaluation of this training program.

Governance: A Program Management Committee (PMC) includes one mentor from each institution to oversee all research training activities. The PMC meets monthly to review progress. In addition, a Program Advisory Committee (PAC) includes representatives from Canadian Medical Association, Academia, Canada Health InfoWay and trainees. The Program Director and Manager are non-voting members. The role of the PAC is to provide overall direction for the project as well as to help develop connections with government and industry. The PAC meets twice a year to review achievements and plans to move forward. One faculty member has been appointed as the project evaluator and is responsible to assess how well the program meets its objectives as well as CIHR reporting requirements. Each institution submits an annual performance report summarizing its activities for the year and the leading university then submits an annual aggregate report to the national funding agency.

Eight faculty partners share responsibility for organizing and teaching Research Learning Experiences. However, one faculty acting as the Program Director, with support provided by a Program Manager, manages the program overall. Overall management has been shared among the university partners.

Hebert & Lau [4] note 6 key program features, including:

- “Focus on six health domains defined by CIHR and six HI research themes based on the expertise of the researchers.
- Creates a collaborative research training environment that leverages and amplifies the strengths of the researchers.
- Uses a transdisciplinary approach, integrating reference disciplines used in HI.
- Emphasizes a value-added curriculum with flexible delivery to provide the richest training experience possible for trainees with varying backgrounds and needs.
- Leverages the use of e-learning technologies to maximize interactions and learning among researchers, trainees and stakeholders.
- Establishes physical and virtual co laboratories to bridge HI research, education and practice.”

Program content is aligned with the six health domains defined by CIHR: cancer research, healthy ageing, public/population health, health policy and services, and cardiovascular/respiratory health. The HI thematic areas are: knowledge management, intelligent health systems, telehealth/telelearning, organizational informatics, e-health applications, e-research applications and genomics. The content is delivered through Research Learning Experience (RLE) modules that include virtual classes, annual on-campus workshops and face-to-face meetings at HI related conferences.

Enabling technologies for content delivery: include the CHPSTP website, a Web-based discussion forum and virtual meeting groupware. These have changed throughout the program subject to the availability at the program director’s university.

Program participants include mentors who were initial investigators and collaborators from the eight partner universities: University of Victoria, Calgary, McMaster, McGill, Waterloo, Toronto, Sherbrooke and Dalhousie. PhD/Postdoc trainees register in existing graduate or post doc programs in one of the eight partner universities. At the same time they are able to take advantage of the collaboratively developed and offered research learning experiences (RLEs).

Deliverables: from trainees include peer-reviewed publications a research proposal, conference paper, research report, business plan or case study.

Challenges: Many lessons were learned in the first iteration of the program. Focus was difficult to achieve, given the breadth of the Health Informatics field. Therefore, the second intake of trainees function as mini-cohorts around the 3 areas that reflect faculty research interests.

Sustainability of the program will continue to be a challenge as long as it depends on grant funding. A joint program officially incorporated in the participating graduate programs would be ideal. However, given the group’s experience with previous projects, this has proven to be a very labor-intensive exercise.

Benefits: for the participating academics include an opportunity to meet and collaborate with academics in HI research field, understand what other researchers are doing and broaden one’s own knowledge and understanding about e-health. The CHPSTP project also provides an excellent opportunity to connect students with experts in a specific research field. Trainees also benefit, as one trainee noted [5]: “Research learning experiences not obtainable from local programs, sharing of leading edge HI research from mentors and stakeholders and building a lifelong virtual learning HI community are what make this curriculum unique. A major advantage of the program is that it allows PhD/postdoc trainees to register in programs offered by one of the eight sponsoring universities, while simultaneously participating in the collaboratively developed RLEs”. National benefits also accrue through promoting the professional status of HI through a program that provides scholarship for talented trainees to pursue a research career in HI, HI education and joint research efforts. The research and education strength built through CHPSTP program is a major influence in HI workforce capacity building in Canada.

Challenges in HI Capacity Building in Australia

Currently there are eight *higher educational institutions* in Australia that offer various course-based training programs in HI (Table 1).

Table 1. The universities in Australia that offers HI education program and the programs they offer.

University	Programs Offered
Central Queensland University	Graduate Certificate, Diploma and Master of Health Informatics
Curtin University of Technology	Bachelor of Health Information Management
La Trobe University	Bachelor of Health Information Management
Monash University	Graduate Certificate, Diploma in Health Informatics
Queensland University of Technology	Bachelor of Health Science (Health Information Management)
Sydney University	Bachelor, Graduate Certificate, Diploma and Master of Health Information Management
The University of Queensland	Master of e-Healthcare
University of Wollongong	Bachelor of Computer Bioinformatics, Graduate Certificate, Master of Health Informatics

The strategies proposed in the Workforce Capacity Building Think Tank in Australia were in the same direction as the CHPSTP program has taken [1]. Therefore, knowledge about CHPSTP

program, such as funding support, governance, key features, program structure, participants and output, will be relevant in considering Australia's approach.

Challenges in HI higher education in Australia: Despite the surge of interest in the HI field in the federal and state health departments, health and medical software industry and academia, the high knowledge and skill requirements for such expertise and low recognition of the existence of HI as a profession in the general public limits the source of students. Few students directly entering university from high school are knowledgeable about HI as a discipline and what HI graduates career paths are. Therefore, students without health background rarely select health informatics as the major field of study. The first author's experience in coordinating "Master of Health Informatics" suggests that a HI program on its own is not yet an economically profitable or viable educational program for universities.

Recommendations for attracting students into HI course: there is a need to take proactive action to promote the profession of HI in IT or health industry. At the initial stage, national scholarships may need to be established, which are advertised through the major media to raise the awareness of the discipline in public and incentives for pursuing the research training program.

Fostering research and education: The CHPSTP program provides a good model for leveraging resources, promoting the discipline and enhancing research collaboration in HI among academia. The first step towards building HI research and education capacity in Australia may be establishing a program similar to Canada's CHPSTP. Funding support, governance, key features, program structure, participants and output may follow this CHPSTP program, yet modified to suit Australian local needs.

Challenges in adopting a collaborative program such as CHPSTP in Australia: There is a big difference between the educational systems in Australia and North America. PhD programs in North America may have course components, which make the online delivery of course content a viable, cost effective and efficient approach. PhD programs in Australia are mainly research project based, normally without compulsory course work requirement. The high demand for expertise in both health and IT makes it difficult for a PhD student to master the breadth of knowledge from a local program. However, requiring PhD students to take compulsory online training courses may not be a legitimate approach in Australia.

An alternative approach could be a collaborative program at the Masters level, with early exit at Graduate Certificate or Diploma. If a student completes four core subjects in HI, Graduate Certificate could be awarded. If a student completes 8 subjects (with designated components of core and elective subjects), a Graduate Diploma could be awarded. However, to build up research capacity in HI, we really need to offer in-depth training opportunities through PhD program.

Conclusion: In response to the national need for solutions to HI research and education capacity building in Australia, this paper introduced the practice of eight Canadian HI higher education providers in establishing an innovative, collaborative HI research training program CHPSTP under support of a Canadian national funding agency. However, because the graduate education system in Australia is different from Canada, will the CHPSTP model work in Australian environment? A number of questions may need to be answered before such a program could be instituted: Who should take the leadership? Where should funding come from? What is the most effective governance and management model that could guarantee success? What is the appropriate content to deliver and mechanisms for delivery? What are the benefits and responsibilities of all the stakeholders involved in such a program? Substantial strategic and tactical issues need to be solved before any such initiative could move forward. This requires a real partnership between higher education providers, government, funding body, health care and medical software industry. Despite

the challenge, Canadians have proven that such an initiative works and can play a vital role in enhancing national research and education capacity in HI.

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