Educating the Health Informatics Professional: The Impact of an Academic Program

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Abstract. Introduction: The successful implementation and utilisation of electronic health information systems is dependent on a highly knowledgeable and skilled workforce. In Australia there is a range of education and training opportunities that seeks to meet these workforce needs. This range of programs reflects both the multi-disciplinary characteristic of health informatics and its wide application within the healthcare environment. We need to discuss the role of each program or type of program in developing a skilled and knowledgeable workforce, and in expanding the knowledge base of the discipline. This paper contributes to such a discussion by describing a pilot study that focused specifically on the role/impact of the University of Tasmania academic health informatics program. **Methods:** The study comprised an anonymous on-line survey followed by a small number of interviews. The online survey included closed questions which gathered quantitative data about Quantitative data were analysed using appropriate numerical methods such as response counts and/or percentages. Open-ended questions were analysed using thematic analysis. **Results:** Qualitative data indicated that course graduates reside in every state and territory, with the majority being employed by the various state health services. The majority of respondents had moved into health informatics professions or into senior positions in health informatics. Eighty percent attributed this directly to their participation in the course. Respondents indicated a strong socio-technical orientation in their approach to health informatics. **Discussion:** The program appears to be having an impact on the health informatics workforce, particularly in promoting a strong socio-technical focus. **Conclusion:** Evaluation of health informatics programs would enable the development of a comprehensive and complementary network of offerings that would meet the diverse needs for health informatics professionals in the healthcare and academic environment.

Keywords. Health informatics education, course impact, course evaluation

Introduction

The successful implementation and utilisation of electronic health information systems depends on a highly knowledgeable and skilled workforce. This workforce includes health informatics professionals together with the clinicians, managers and researchers who regularly use health information. It should also include academic health informaticians who contribute to research and the education of the profession. [1,]. In Australia a range of education and training opportunities seek to meet these workforce needs. Offerings include health informatics academic programs, health informatics

streams within other academic programs and health informatics content in related disciplines such as health information management, information systems and computing programs. Health informatics units are also offered in clinical, allied health and information management academic programs. Other pathways to achieving skills and knowledge include short health informatics courses and professional certification programs such as the recently introduced Certified Health Informatician Australasia (CHIA) program [2]. Appendix 1 gives an indication of the range of courses and programs currently offered. This range reflects both the multi-disciplinary characteristic of health informatics and its wide application within the healthcare environment. At the same time it contributes to a situation where 'there is no single recognised means of entry into the workforce, and no restrictions on entry beyond what an employer may specifically require' [3]. This lack of parameters creates questions around core knowledge and skills required of practicing health informaticians. The CHIA program seeks to establish parameters for entry into the workforce by 'seeking to ensure that health informatics professionals have a common core of knowledge and skills' [2]. The CHIA program may therefore be viewed as an entry point into the profession. However, it does not identify to the relationship between CHIA and other education and training programs. This is an interesting issues given that the educational criteria for entry into the CHIA program itself is 'any degree and does not have to be in health informatics' [2]. This raises questions, particularly for specific health informatics academic programs. Potential health informaticians may well ask 'Why do I need to do a health informatics degree/postgraduate degree, if any degree is accepted?' Answering these questions would explicate the relationship between academic qualifications and professional certification programs, while also differentiating between health informatics and related professions. There is a need for such a discussion [4, 5]. This paper contributes to such a discussion, reporting on a pilot study that tracked graduates and current students of the University of Tasmania post-graduate e-health (Health Informatics) courses to consider the role/contribution of academic health informatics programs. The aims of the study were to:

- Map the location of UTas health informatics graduates and current students in health services across Australia
- Map professional location of these graduates., differentiating between health professionals and health informatics professionals
- Explore the impact of the UTas program on graduates' approaches to the practice of health informatics

1. The Health Informatics Program

1.1. The Courses

The UTas Health Informatics program commenced in 2002 offering a Graduate Certificate and a Graduate Diploma. A Masters course was introduced in 2012. These courses emphasise knowledge and skill development for health informatics professionals and for health professionals wishing to enhance their understanding of health informatics. A Bachelor of Health Informatics (Professional Honours) was introduced in 2013. This course seeks to enhance health informatics research skills and provide a pathway into academic research opportunities. All courses are offered part-

time, on-line with no compulsory face-to-face component. This attracts enrolments from across Australia.

1.2. Approach to Health Informatics

The UTas program emphasises health informatics as a socio-technical discipline and profession. While health informatics is broadly represented as a socio-technical discipline, this is not always evident in academic or professional discussions. While it is acknowledged that the people and processes that comprise the social system are integral to health informatics, they are often discussed in the context of minimising resistance to the technological system and problems are formulated in terms of understanding and minimising this resistance in the immediate environment [6]. The UTas program views the socio-technical systems as extending beyond the immediate environment. 'Socio-technical systems at the local level will be influenced by broader economic, political and cultural systems and vice versa' [7]. In doing so, the program encourages students to critically explore cultural, economic, political and legal issues associated with the implementation of health information systems. In so doing the program aims to produce critical and reflective health informatics practitioners, teachers and researchers

2. The Study

2.1. Method

The study comprised an anonymous on-line survey followed by a small number of interviews. The online survey included closed questions which gathered quantitative data about the distribution of graduates across Australian health systems and health professions. Open-ended survey questions and interviews explored the effectiveness of the course in supporting health informatics careers and the influence of the content and focus of the course on the way graduates approached health informatics. All graduates and current students of the health informatics program were invited to participate. Participants were recruited via the university email system. The email was also sent to an alternative email where available. The email included an information sheet about the project and survey and a link to the survey website. Ninety emails were sent. Forty-seven were recorded as undelivered. It was therefore assumed that forty-three emails were delivered. Of these, twenty-four graduates/students (57%) completed the online survey. Seven respondents indicated their willingness to be interviewed.

2.2. Data Analysis

Quantitative data were analysed using appropriate numerical methods (such as response counts and/or percentages). Open-ended questions were analysed using thematic analysis. Thematic analysis suits questions related to people's views or perceptions [8, 9]. It was therefore considered appropriate for this study. The initial stages of the analysis involved an iterative reading of the survey responses and interview transcripts to identify recurring comments, phrases and terms. These were grouped into broad

categories or themes. The focus of this analysis was on explicit rather than implicit meanings in the text [10].

3. Results

3.1. Quantitative Results: Location of Graduates

The quantitative data provided information about the distribution of graduates across Australian health systems and health professions. University enrolment data indicates that students in the program reside in all states and territories in Australia. Survey respondents, although small in number, reflected this dispersion, with respondents residing in every state and territory. The majority were employed by the various state health services. One was employed by the Commonwealth Department of Health, one by a Medicare Local, three were employed by commercial companies and one was unemployed.

The data were analysed to identify any change in position since commencing the course. Participants who had changed they had changed employer/position were asked whether and if this represented a promotion. As Table 1 shows, prior to commencing the course, nine respondents were working in health informatics positions (shaded cells). After completing the course, a further five respondents had moved into health informatics positions. Twelve respondents reported that they had been promoted. This included seven who had previously been in health informatics positions and the five respondents who had moved into health informatics roles. It is noted that two respondents self-reported a promotion while using the same job title. Descriptions of roles suggested that while the job title remained the same, the scope of the positions had broadened. Overall, job titles and description pointed to many course participants being at the tactical and strategic planning level of departments and organisations.

Table 1. Pre and post course position/profession.

Pre-Course Profession/position	Post-Course Profession/position	Promotion
Administration	Health Informatics Lecturer	Y
Consultant Clinical Pharmacist	Informatics Pharmacist	Y
Health Librarian	Health Librarian	
Clinical Nurse Consultant Research Coordinator	Clinical Nurse Consultant Research Coordinator	
Sales & Accounts – CIS	Consultant	Y
Health Informatics	EHR Business System Manager	Y
Allied Health	Allied Health	
E-Health Support	E-Health Manager	Y
EMR Manager	EMR Manager	Y
Health Systems Coordinator	Human Machine Interface Development	
EHR Systems Project Officer	EHR Systems Project Officer	Y

Doctor	Doctor	
Medicine	Doctor	
Nursing	Clinical Systems Administrator	
Psychologist	Unemployed	
Nursing	Nursing	
ICT Advisor	ICT Strategic Advisor	Y
E-Health Policy	ICT Business intelligence	Y
Electronic Medical Record Trainer	Data Manager	Y
Physiotherapy	Senior Paediatric Physiotherapist	
Business Analyst	Assistant Director – Data Warehouse Environment	Y
Business Manager	E-Health Clinical Software and Secure Messaging	Y
Manager (Health Informatics)	Manager (Health Informatics)	

3.2. Qualitative Thematic Analysis

Thematic analysis of the open-ended survey questions and interviews explored participant perceptions of the effectiveness of the course in supporting health informatics careers and the influence of the socio-technical perspective on the way graduates implemented health informatics.

3.2.1. Impact of Course on Career

Respondents who had changed employer or positions were asked if they believed that their participation in the course had impacted on this change. Of the 14 who had changed positions, 12 (88%) answered yes. In analysing responses, one major theme and one minor theme were identified. The major theme attributed the change primarily to participation in the program. Respondents referred to the course providing them with a richer understanding of the domain of health informatics and the confidence to apply for promotion. The minor theme considered that participation in the course was one of several factors interacting to enable them to change. In addition, stated that he/she had accepted a role as the clinical representative for an e-health management group, which 'I would never have considered prior to the course'. These responses, while not negating the impact of other variables, do indicate that the UTas program is influencing career choices and progression of its graduates.

3.2.2. Impact of the Program on Graduates' Approach to Health Informatics Activities

Participants were asked how they felt involvement in the program influenced their ideas about health informatics. The analysis identified three distinct themes. One theme spoke of the course providing new and advanced skills and knowledge that participants applied at both the operational and strategic level. A second theme discussed the course

in terms of clarifying, structuring and consolidated existing understanding. This view was primarily expressed by respondents working in health informatics prior to commencing the course. A third theme focused on expectations about the potential of health informatics. Respondents spoke of the need to think critically about the potential and limitations of health informatics solutions. All three themes shared the belief that the course had given participants confidence to express their views and knowledge and to apply their skills.

3.2.3. Relevance of a Socio-technical Perspective

Participants were asked whether they cultural and organisational issues influenced the uptake of health informatics systems. This was intended to determine the extent to which they approached health informatics as a socio-technical discipline. All responses supported the need for a socio-technical orientation. Two complementary themes were identified. The first spoke of the need for strong leadership that promoted cultural change. The second reflected a more negative orientation, emphasising that a focus on the technology lack of understanding of cultural and organisational factors acted as a barrier to successful implementation of electronic information systems.

4. Discussion

The pilot study explored the role/impact of an academic health informatics education program by mapping the professional and geographical location of graduates and current students in health services across Australia and by exploring the impact of program on graduate's approach to the practice of health informatics. While the number of participants in the study was low, the results indicate that the program is having an impact on the health informatics workforce. This is indicated by the spread of graduates across all states and territories where they are increasingly taking up health informatics roles, adopting senior positions and contributing to the professional activities of health informatics organisations. The results also point to the success of the program in producing graduates who strongly advocate and seek to implement a socio-technical approach to health informatics.

While the results suggest that the program is successfully contributing to producing a skilled and knowledgeable workforce, several factors may have affected the study. The project, from initial planning to final report, was required to be completed within six months. This impacted on the capacity to recruit participants and conduct the face-to-face interviews. Finally, as with many surveys, hindsight pointed to questions that could have been asked. For example, during the interviews it became apparent that graduates are not only filling influential roles in the workplace but are also taking on roles such as membership of professional organisations. A question relating to this issue would have provided more insight into the influence of the program.

5. Conclusion

The successful implementation and utilsation of electronic health information systems is dependent on a highly knowledgeable and skilled workforce. A range of courses and

other initiatives seek to meet this need. It is important to consider the roles and contributions of these programs in developing not just a skilled and knowledgeable workforce but also the health informatics researchers and educators who build the knowledge base of the discipline. While there may be different views about relevance or appropriateness of various programs there has been little analysis to determine the role of each in the overall framework of health informatics education.

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Appendix 1: Indication of courses and programs currently offered in Australia

Health Informatics Courses	
Institution	Program
Griffith University	Graduate Certificate in Health Informatics
Melbourne University	Bachelor of Biomedicine – Health informatics major
University of Sydney	Master of Information Technology
University of Tasmania	Bachelor of E-Health (Health Informatics (Professional Honours) Graduate Certificate in E-Health (Health informatics) Graduate Diploma in E-Health (Health informatics) Masters of in E-Health (Health informatics)
University of Western Sydney	Graduate Certificate in Health Informatics

University of Wollongong	Master of Health Informatics
University of Queensland	Master of Bioinformatics
Health information management courses incorporating health informatics	
Institution	Program
Curtin University	Bachelor of Health Science (Health Information Management)
La Trobe University	Bachelor of Health Information Management Master of Health Information Management
University of Western Sydney	Bachelor of Information Management and Communications Technology (Health Information Management)
University of Queensland	Master of e-Healthcare
University of Technology, Sydney	Master of Health Services Management
Units	
Institution	Unit
Monash	Nursing Informatics
University of Tasmania	Health Services and Health Informatics
Australian Catholic University	Health Informatics (e-Health)
Short Courses	
Institution	Program
Flinders University	Short Health Informatics Course
University of Western Sydney	Australian Health Informatics Summer School