

CONTEXT SENSITIVE HEALTH INFORMATICS:  
MANY PLACES, MANY USERS, MANY CONTEXTS,  
MANY USES

# Studies in Health Technology and Informatics

This book series was started in 1990 to promote research conducted under the auspices of the EC programmes' Advanced Informatics in Medicine (AIM) and Biomedical and Health Research (BHR) bioengineering branch. A driving aspect of international health informatics is that telecommunication technology, rehabilitative technology, intelligent home technology and many other components are moving together and form one integrated world of information and communication media. The series has been accepted by MEDLINE/PubMed, SciVerse Scopus, EMCare, Book Citation Index – Science and Thomson Reuters' Conference Proceedings Citation Index.

## Series Editors:

Dr. O. Bodenreider, Dr. J.P. Christensen, Prof. G. de Moor, Prof. A. Famili, Dr. U. Fors, Prof. A. Hasman, Prof. E.J.S. Hovenga, Prof. L. Hunter, Dr. I. Iakovidis, Dr. Z. Kolitsi, Mr. O. Le Dour, Dr. A. Lymberis, Prof. J. Mantas, Prof. M.A. Musen, Prof. P.F. Niederer, Prof. A. Pedotti, Prof. O. Rienhoff, Prof. F.H. Roger France, Dr. N. Rossing, Prof. N. Saranummi, Dr. E.R. Siegel, Prof. T. Solomonides and Dr. P. Wilson

## Volume 218

### *Recently published in this series*

- Vol. 217. C. Sík-Lányi, E.-J. Hoogerwerf, K. Miesenberger and P. Cudd (Eds.), *Assistive Technology – Building Bridges*
- Vol. 216. I.N. Sarkar, A. Georgiou and P. Mazzoncini de Azevedo Marques (Eds.), *MEDINFO 2015: eHealth-enabled Health – Proceedings of the 15th World Congress on Health and Biomedical Informatics*
- Vol. 215. L. Botín, P. Bertelsen and C. Nøhr (Eds.), *Techno-Anthropology in Health Informatics – Methodologies for Improving Human-Technology Relations*
- Vol. 214. A. Georgiou, H. Grain and L.K. Schaper (Eds.), *Driving Reform: Digital Health is Everyone's Business – Selected Papers from the 23rd Australian National Health Informatics Conference (HIC 2015)*
- Vol. 213. J. Mantas, A. Hasman and M.S. Househ (Eds.), *Enabling Health Informatics Applications*
- Vol. 212. D. Hayn, G. Schreier, E. Ammenwerth and A. Hörbst (Eds.), *eHealth2015 – Health Informatics Meets eHealth*
- Vol. 211. B. Blobel, M. Lindén and M.U. Ahmed (Eds.), *pHealth 2015 – Proceedings of the 12th International Conference on Wearable Micro and Nano Technologies for Personalized Health, 2–4 June 2015, Västerås, Sweden*
- Vol. 210. R. Cornet, S.K. Andersen, L. Stoicu-Tivadar, C.L. Parra Calderón, M. Hercigonja-Szekeres and A. Hörbst (Eds.), *Digital Healthcare Empowering Europeans: Proceedings of MIE2015*

ISSN 0926-9630 (print)  
ISSN 1879-8365 (online)

# Context Sensitive Health Informatics: Many Places, Many Users, Many Contexts, Many Uses

Edited by

**Elizabeth M. Borycki**

*School of Health Information Science, University of Victoria, Victoria, British  
Columbia, Canada*

**Andre W. Kushniruk**

*School of Health Information Science, University of Victoria, Victoria, British  
Columbia, Canada*

**Craig E. Kuziemsky**

*Health Systems Program in the Telfer School of Management at the University  
of Ottawa, Ottawa, Canada*

and

**Christian Nørhr**

*Department of Development and Planning, Aalborg University, Denmark*

**IOS**  
Press

Amsterdam • Berlin • Tokyo • Washington, DC

© 2015 The authors and IOS Press.

This book is published online with Open Access by IOS Press and distributed under the terms of the Creative Commons Attribution Non-Commercial License.

ISBN 978-1-61499-573-9 (print)

ISBN 978-1-61499-574-6 (online)

Library of Congress Control Number: 2015948344

*Publisher*

IOS Press BV

Nieuwe Hemweg 6B

1013 BG Amsterdam

Netherlands

fax: +31 20 687 0019

e-mail: [order@iospress.nl](mailto:order@iospress.nl)

*Distributor in the USA and Canada*

IOS Press, Inc.

4502 Rachael Manor Drive

Fairfax, VA 22032

USA

fax: +1 703 323 3668

e-mail: [iosbooks@iospress.com](mailto:iosbooks@iospress.com)

LEGAL NOTICE

The publisher is not responsible for the use which might be made of the following information.

PRINTED IN THE NETHERLANDS

## CSHI 2015 Conference Committees

Local Organizing Committee: Pontifical Catholic University of Paraná – PUCPR, Curitiba, Paraná, Brazil

Deborah Carvalho

Percy Nohama

Diego Garcia

Lilian Cintho

Heloá Borim

Munir Gariba

Claudia Moro

Scientific Program Committee: Chairs and Co-chairs of the IMIA working groups

Craig Kuziemsky, University of Ottawa, Canada

Andrew Georgiou, University of New South Wales, Australia

Christian Nøhr, Aalborg University, Denmark

Hiroshi Takeda, Osaka University Hospital, Suita, Japan

Elizabeth Borycki, University of Victoria, BC, Canada

Andre Kushniruk, University of Victoria, BC, Canada

Rebecca Randell, University of Leeds, UK

Farah Magrabi, University of New South Wales, Australia

Student and Best Paper Award Chair Committee

Peter Elkin, University at Buffalo, The State University of New York, US

Student Program Committee

Helen Monkman, University of Victoria, BC, Canada

Liisa Parv, University of Tallinn, Estonia

Romarc Marcilly, University of Lille, France

Sidsel Villumsen, Aalborg University, Denmark

Editorial Committee

Elizabeth Borycki

Andre Kushniruk

Craig Kuziemsky

Christian Nøhr

Paper Reviewers

Pernille Bertelsen

Elizabeth Borycki

Marie-Catherine Beuscart-Zephir

Lars Botin

Catherine Craven

Elizabeth Cummings

Peter Elkin

Andrew Georgiou  
Yang Gong  
David Kaufman  
Ross Koppel  
Andre Kushniruk  
Craig Kuziemsky  
Farah Magrabi  
Romaric Marcilly  
Helen Monkman  
Christian Nøhr  
Laurie Novak  
Linda Peute  
Lisa Paarv  
Silvia Pelayo  
Lone Stub Petersen  
Stine Loft Rasmussen  
Katherine Sellen  
Yalini Senathirajah  
Aviv Shachak  
Paul Turner

# Contents

|  |     |
|--|-----|
| CSHI 2015 Conference Committees  | v   |
| About the Editors  | vii |
| Disclaimer   | ix  |
| Theories and Methods for Context Sensitive Health Informatics<br><i>Christian Nøhr, Elizabeth M. Borycki, Andre W. Kushniruk<br/>and Craig E. Kuziemsky</i>  | 1   |
| <b>Different Users in Different Contexts</b>   |     |
| From Research Prototypes to a Marketable eHealth System<br><i>Tariq Andersen, Finn Kensing, Lisbeth Kjellberg and Jonas Moll</i>   | 9   |
| User Preferences for Improving the Estonian National e-Prescription Service<br><i>Liisa Parv, Helen Monkman and Raimo Laus</i>   | 15  |
| Physician Experiences with Perceived Pressure to Order Diagnostic Imaging Services<br><i>Janessa Griffith, Helen Monkman, Elizabeth Borycki and Andre Kushniruk</i>  | 20  |
| The Consumer Health Information System Adoption Model<br><i>Helen Monkman and Andre W. Kushniruk</i>   | 26  |
| Communication Pattern Regarding Alarms and Patient Signals Between Nurses, Other Health Care Actors, Patients and Devices<br><i>Terje Solvoll, Adrienne Hanenburg, Alain Giordanego<br/>and Gunnar Hartvigsen</i>  | 32  |
| Teaching Nursing Informatics in Australia, Canada and Denmark<br><i>Elizabeth Cummings, Elizabeth M. Borycki and Inge Madsen</i>   | 39  |
| Nurse Practitioner Perceptions of the Impact of Electronic Medical Records Upon Clinical Practice<br><i>Elizabeth M. Borycki, Esther Sangster-Gormley, Rita Schreiber,<br/>April Feddema, Janessa Griffith and Mindy Swamy</i>   | 45  |
| <b>Evaluating for Context Through Usability Testing and Ensuring Patient Safety</b>  |     |
| Towards Evidence Based Usability in Health Informatics?<br><i>Romarc Marcilly, Linda W. Peute, Marie-Catherine Beuscart-Zephir<br/>and Monique W. Jaspers</i>  | 55  |
| Usability Evaluation of a Medication Reconciliation and Allergy Review (MRAR) Kiosk: A Methodological Approach for Analyzing User Interactions<br><i>Blake Lesselroth, Kathleen Adams, Stephanie Tallett, Scott Ragland,<br/>Victoria Church, Elizabeth M. Borycki and Andre Kushniruk</i> | 61  |

|   |     |
|---|-----|
| Development of a Video Coding Scheme for Analyzing the Usability and Usefulness of Health Information Systems<br><i>Andre W. Kushniruk and Elizabeth M. Borycki</i>   | 68  |
| Enhancing Healthcare Provider Feedback and Personal Health Literacy: Dual Use of a Decision Quality Measure<br><i>Mette Kjer Kaltoft, Jesper Bo Nielsen, Glenn Salkeld and Jack Dowie</i>   | 74  |
| Medication Review: Human Factors Study Aiming at Helping an Acute Geriatric Unit to Sustain and Systematize the Process<br><i>Clément Wawrzyniak, Marie-Catherine Beuscart-Zephir, Romaric Marcilly, Laura Douze, Jean-Baptiste Beuscart, Dominique Lecoutre, François Puisieux and Sylvia Pelayo</i> | 80  |
| Safer Design – Composable EHRs and Mechanisms for Safety<br><i>Yalini Senathirajah</i>  | 86  |
| Enhancing Patient Safety Event Reporting by K-Nearest Neighbor Classifier<br><i>Chen Liang and Yang Gong</i>  | 93  |
| Integrating Methods to Evaluate Health Information Systems<br><i>Heloá Costa Borim, Lilian Mie Mukai, Lucas Emanuel Silva E Oliveira, Vagner José Lopes and Claudia Maria Cabral Moro</i>   | 100 |
| <b>Organizational and Social Issues in Different Contexts</b>   |     |
| Information Issues and Contexts that Impair Team Based Communication Workflow: A Palliative Sedation Case Study<br><i>Alex Cornett and Craig Kuziemsky</i>  | 107 |
| The Role of Medical Transcriptionists in Producing High-Quality Documentation<br><i>Monika A. Johansen, Åse-Merete Pedersen and Gunnar Ellingsen</i>  | 114 |
| A Sequential Data Analysis Approach to Electronic Health Record Workflow<br><i>David R. Kaufman, Stephanie K. Furniss, Maria Adela Grando, David W. Larson and Matthew M. Burton</i>  | 120 |
| Unveiling the Mobile Learning Paradox<br><i>Carey Mather and Elizabeth Cummings</i>   | 126 |
| The Role of the IT Department in Organizational Redesign<br><i>Lone Stub Petersen</i>   | 132 |
| Monitoring the Amount of Practical Use of eHealth on National Level by Use of Log Data: Lessons Learned<br><i>Sidsel Villumsen, Guðrún Auður Harðardóttir, Maarit Kangas, Heidi Gilstad, Berit Johanne Brattheim, Jarmo Reponen, Hannele Hypponen and Christian Nøhr</i>                              | 138 |
| Work System Characteristics Impacting the Performance and Quality of the Discharge Letter Process<br><i>Ludivine Watbled, Marie-Catherine Beuscart-Zephir, Sandra Guerlinger, Laura Douze, Eric Lepage, Stéfan J. Darmoni and Romaric Marcilly</i>  | 145 |



**Understanding Different Contexts Using Theory**

|   |     |
|---|-----|
| The Question Concerning Narration of Self in Health Informatics<br><i>Lars Botin</i>  | 153 |
| Understanding the Context of Patient Safety Through the Lenses of Three<br>IMIA Working Groups<br><i>Craig E. Kuziemsky, Christian Nøhr, Elizabeth M. Borycki,<br/>Andre W. Kushniruk and Yalini Senathirajah</i> | 159 |
| The Contextualization of Archetypes: Clinical Template Governance<br><i>Rune Pedersen, Gro-Hilde Ulriksen and Gunnar Ellingsen</i>  | 166 |
| Health Informatics Can Avoid Committing Symbolic Violence by Recognizing<br>and Supporting Generic Decision-Making Competencies<br><i>Mette Kjer Kaltoft, Jesper Bo Nielsen, Glenn Salkeld and Jack Dowie</i>     | 172 |
| Subject Index   | 179 |
| Author Index  | 181 |

# Teaching Nursing Informatics in Australia, Canada and Denmark

Elizabeth CUMMINGS<sup>a, 1</sup>, Elizabeth M. BORYCKI<sup>b</sup>, and Inge MADSEN<sup>c</sup>

<sup>a</sup> *School of Nursing and Midwifery, University of Tasmania, Tasmania, Australia*

<sup>b</sup> *School of Health Information Science, University of Victoria, Victoria, British Columbia, Canada*

<sup>c</sup> *Centre of Clinical Guideline, Department of Health Science and Technology, University of Aalborg, Denmark*

**Abstract.** Whilst there is a strong interest in nursing informatics in the graduate nurse population, nursing informatics has been slow to be incorporated into the undergraduate nursing curriculum. Nursing schools in Australia, Canada, and Denmark are all currently involved in redeveloping their curricula to include nursing informatics in a meaningful way. This paper provides a brief historical description of the uptake of nursing informatics in each of the three countries and discusses the required future directions and strategies towards incorporating nursing informatics into the undergraduate curriculum.

**Keywords.** Nursing informatics, nursing education, nursing curriculum, informatics education

## Introduction

The explosion in the number of health information technologies (HIT) that are being implemented in health care settings has resulted in a transformation of work practices. Internationally, there is a belief, common to most policy makers and clinicians, that HIT can improve the quality of patient care and deliver cost efficient patient health outcomes. However, it is essential that entry-level members of the nursing profession possess the knowledge and skills to incorporate HIT into their practice in a meaningful way. This requires undergraduate nurses to be provided with the knowledge, skills, judgment as well as the means for learning about the use of HIT in the context of undergraduate nursing curricula. This involves students' understanding the importance of informatics from the commencement of their training. In this paper we provide a historical description of the uptake of nursing informatics in Australia, Canada, and Denmark demonstrating the different approaches in terms of past and current strategies that are being used to incorporate nursing informatics into undergraduate curricula.

---

<sup>1</sup> Corresponding Author: Elizabeth Cummings, Email: Elizabeth.Cummings@utas.edu.au.

## **1. Historical Development of Nursing Informatics Education**

Nursing informatics is an area that needs to be integrated into the nursing curricula internationally. Around the world, countries are in differing stages of this process. Internationally, nurses can learn from each other where these competencies are concerned. For example, Australia, Canada, and Denmark, each have developed differing strategies for introducing nursing informatics into the nursing curriculum. We begin by reviewing the development of nursing informatics in these countries. It is interesting and worthy to note that each country has engaged in formative work in this area for up to 30 years in advance.

### *1.1. Australia*

Australian nursing informatics began in 1984 and as a discipline has had a significant impact on the education of nurses and other health professionals in relation to the use of digitised health information. However, the focus in the past was on post-registration training or adoption of nursing informatics and to a degree resulted in the development of specialists in the area, albeit specialists with a broad scope of practice [1]. Ribbons [2] reported on a study of all Australian Schools of Nursing conducted in 1993. This study examined the perceived most significant obstacles to providing IT education to student nurses. It found the most significant barrier was that staff felt they were "hampered by a lack of time, developmental or technical assistance, faculty skills, funding, training opportunities, faculty commitment and appropriate software" [2]. A study by Hardy and colleagues [3] explored the perceptions of students commencing a bachelors level nursing degree. This study asked the students about their actual and desired knowledge about technology as it relates to nursing care. The respondents indicated that they need more, and relevant, experiences with the applications and systems used in the daily care of patients. They also indicated a need for an increased theoretical understanding of informatics [3]. However, despite these early studies into the educational needs of Australian undergraduate nursing students limited informatics content was introduced into the undergraduate curriculum.

### *1.2. Canada*

In Canada nurses first began to take an interest in nursing informatics with the introduction of hospital based information systems in the 1980's, but it was not until 1998 when the Canadian Nurses Association (CNA) initiated the National Nursing Informatics Project in an effort "to begin to develop a national consensus and priorities in nursing informatics development" [4]. This initial work focused on developing a definition of nursing informatics, recommending informatics competencies for entry level nurses, educators, specialists, managers and educators. In addition to this, suggestions were made about how to include nursing informatics competency development in a nursing curriculum at a basic level, and priorities were set for implementing nursing informatics education in Canada [4]. As part of this work the CNA also spearheaded the development of a nursing minimum data set that reflects nursing care, followed by the release of several key documents defining and outlining aspects of nursing informatics [4, 5].

In 2002-2003 the Canadian Nursing Informatics Association (CNIA) in conjunction with the Office of the Information Highway and Health Canada researched

the state of nursing informatics education in Canada. The level of nursing faculty preparedness in the area, and the information and communication technology infrastructures present in Canadian nursing schools were studied [6]. Findings from this work revealed that undergraduate nursing programs lacked the basic content necessary to fully educate students about nursing informatics, and that “efforts to engage nurse educators in discussions regarding the significance of informatics for tomorrow's nurses had been met with limited interest and understanding” [6]. The research also suggested “there was an obvious need to heighten the awareness and active participation of nurse leaders in the development of strategies to attend to the informatics education needs of Canadian nurses” [6].

### *1.3. Denmark*

Nursing informatics was introduced in Denmark in the early 1990's. It was strongly inspired by the international working group for Health informatics of the International Medical Informatics Association (IMIA). The International European Nightingale project had an impact on Danish development of nursing informatics in nursing schools [7] and was followed by the SIP project that was aimed at pushing “technical education for nursing students and the telematics project” led by Mantas [8], but it was not integrated in the Nursing bachelor's curriculum until 2001.

## **2. Current State**

As outlined above, the focus of nursing informatics education was more upon skilling registered nurses to become informaticians rather than developing nursing informatics competencies in nursing students. However, it has become evident that all nurses require an understanding of informatics irrespective of their level and location.

### *2.1. Australia*

A 2007 study of nurses and information technology by Hegney et al. [9] indicated that nurses continue to be underprepared to incorporate information technology in their practice. The study found that approximately one third of nurses had received formal training in the use of basic software. It is also concerning to note that as recently as 2008 Thompson and Skiba [10] found that nursing informatics training continued to be equated to computer and information literacy. Since this research was published, there has been an increasing drive to ensure that universities include nursing informatics at all levels. The Coalition of National Nursing Organizations (CONNO) in its 2008 position statement [11] indicated that support is required to provide nursing informatics in the core content of undergraduate curricula and should be provided to all nursing education providers. CONNO states that it is “vital that nurses remain engaged with the issues associated with the development and roll-out of clinical communications systems to ensure the unique discipline of nursing, and its interventions and associated outcomes, are accurately captured by the clinical information systems being implemented” [11]. In 2012 the Australian Nursing and Midwifery Accreditation Council (ANMAC) released new standards for accreditation of nursing education. The new standards include informatics requirements including “familiarity with health informatics, including person-controlled electronic health care records” [12]. ANMAC

acknowledges the importance of developing “the capacity to innovatively use information technology and electronic resources to research the growing evidence base for improved care and treatment methods” [12]. For a nursing degree to be accredited in Australia it must include informatics. There remains a missing piece in the puzzle though: despite the development of national NI competencies for undergraduate nursing students in Australia [13] the competencies are yet to be accepted by the regulating bodies. With approved competencies linked to the ANMAC accreditation standards it will become easier to gain consistency in the inclusion of NI in the undergraduate curriculum.

### *2.2. Canada*

In Canada since 2003, we have seen an increase in the number of nursing informatics courses and certificate programs being offered in Schools of Nursing at the undergraduate and graduate level [14, 15]. In 2009 the first graduate program in nursing informatics was approved [16]. The program was developed through a partnership between a school of nursing and health informatics, and includes graduate courses in nursing and health informatics as well as two experiential learning opportunities, where students work in industry roles that allow them to develop their nursing informatics expertise [17]. The program allows nurses to graduate with Masters level competencies in nursing and health informatics [16]. In 2012, the Canadian Association of Schools of Nursing (CASN) in partnership with Canada Health Infoway developed Nursing Informatics Competencies for Entry-to-practice for Registered Nurses [see 18] and learning tools and resources that can help faculty to teach undergraduate nursing informatics competencies to students [19]. The work was critical to identifying modern, entry level nursing informatics competencies [13, 18]. Today, CASN is actively involved in supporting faculty in a peer to peer network to help faculty master nursing informatics competencies and integrate them into nursing curricula across the country. Peer leaders will engage nursing faculty across the country and provide mentorship and support to faculty members in Schools of Nursing [20].

### *2.3. Denmark*

In Denmark, the nursing curriculum is prescribed at a national level by the Ministry of Education through Departmental Order 29, which determined that a program includes theoretical and clinical technological development is required in the nursing degree [21]. Order 29 contains specific requirements for the inclusion of theory relating to: nursing terminology; electronic structured nursing documentation; clinical databases and quality development; electronic communication with the patient/citizens; and electronic communication between hospitals and primary health care [22]. This ensures that nursing informatics commences in the bachelors program, 18 months after start and meets the prescribed minimum content requirements. It contains IT based communication, cooperation and understanding about how health informatics is used in relation to the health care professional area. This discrete module, worth two ECT points, consists of 27 lectures, mandatory assignments, and an individual oral exam.

### 3. Discussion

It is evident that all three countries continue to be aiming to produce beginning level nurses with nursing informatics skills, knowledge and judgment. These are nurses who “have fundamental information management and computer technology skills and use existing information systems and available information to manage their practice” [23]. Based on work by Schulte [24] there are a number of components of a basic course that help to get students to the level of beginning nurses in relation to Nursing Informatics that can be applied here. These basic skills include:

- Select, access, and search appropriate databases and the Web; evaluate Web sites; relate information technology, information literacy, and evidence- based practice
- Define, describe, and discuss basics about standardized languages and their impact
- Describe the transformation of data and information into knowledge (knowledge management)
- Introduction to electronic health and medical records
- Understand how to handle patient information ethically, data security, social media use and communication

One key issue in successfully incorporating nursing informatics into undergraduate degrees is the developing up our educators so that they are confident and competent. Recently, there has been recognition that there are few faculty members who have preparation in nursing informatics and these individuals are not uniformly distributed among nursing programs. This recognition has led to Canada developing peer-to-peer faculty networks across university schools of nursing so that faculty who have expertise in teaching nursing and informatics can help faculty who do not have this type of expertise to develop informatics related competencies and to exchange experiences in terms of teaching the competencies and how they might be integrated into education [20].

To date, it appears that Denmark has integrated nursing informatics into the undergraduate nursing programs more successfully than both Canada and Australia, who are only beginning to embark on this process. Informatics is uniformly present in nursing curricula and there are nurses who are prepared in the field of nursing informatics who teach these courses. Australia and Canada have recently developed nursing informatics competencies that can be integrated into an undergraduate curriculum.

### 4. Conclusion

Whilst there are differences in the development, evolution and integration of nursing informatics into undergraduate education between the three countries there is evidence of an increased recognition of the importance of NI education. It is becoming increasingly important that our new graduate nurses are able to understand and incorporate NI into their work from the first shift in the workplace. To achieve this, there is a requirement to incorporate entry level competencies and develop skills and competence in the nursing education workforce.

## References

- [1] E. Hovenga, Nursing informatics in Australia, *MD Computing* **14** (1997), 119–25.
- [2] R.M. Ribbons, *Factors inhibiting the growth of instructional computing in nurse education: A national perspective Fourth Health Informatics Association of New South Wales Conference*, Oasis Resort Primbee NSW, Australia, 1995.
- [3] J.L. Hardy, R. Lindqvist, M. L. Kristofferzonband, O. Dahlberg, *The current status of Nursing Informatics in undergraduate nursing programs: Comparative case studies between Sweden and Australia*, *Nursing Informatics* U. Gerdin et al. (Eds.) IOS Press 1997, 132-136
- [4] J. Kaminsky, *Brief history of nursing informatics in Canada*. 2014: <http://www.nursing-informatics.com/kwantlen/history.html>
- [5] Canadian Nurses Association. *Collecting data to reflect nursing impact: A discussion paper*. CNA: Ottawa, 2000.
- [6] L. M. Nagle, H. F. Clarke, Assessing informatics in Canadian schools of nursing. *Stud Health Tech Inform* **107** (2004), 912-915.
- [7] R. Kolbæk, Methods of Introducing Nursing Informatics to Nursing Students. In: *Proceedings from HTE 96. 1 European Conference on health Telematics Education* Corfu, Greece. The Nightingale Project – CD Rom version, 1996.
- [8] J. Mantas, Developing curriculum in nursing informatics in Europe, *IJMI* **50**(1-3) (1998), 123 – 132.
- [9] D. Hegney, E. Buikstra, R. Eley, T. Fallon, V. Gilmore, J. Soar, *Nurses and Information Technology: Final Report*. Commonwealth of Australia: Canberra. [http://anmf.org.au/documents/reports/IT\\_Project.pdf](http://anmf.org.au/documents/reports/IT_Project.pdf) (2007). [Accessed on December 3, 2014].
- [10] B.W. Thompson, D.J. Skiba, Informatics in the nursing curriculum: a national survey of nursing informatics requirements in nursing curricula, *Nurs Educ Perspect* **29**(5) (2008), 312–317.
- [11] CONNO (Coalition of National Nursing Organisations), *Position Statement Nursing and E-health* <http://www.conno.org.au/publications>, 2008 [Accessed July 23, 2013].
- [12] ANMAC, *Australian Nursing and Midwifery Accreditation Council Registered Nurse Accreditation Standards*, available at: <http://www.anmac.org.au/accreditation-standards>, 2012 [Accessed July 23, 2013].
- [13] E.M. Borycki, J. Foster, A comparison of Australian and Canadian informatics competencies for undergraduate nurses, *Stud Health Tech Inform* **201** (2014), 349-55.
- [14] Canadian Nursing Informatics Association. *Education*. <https://cnia.ca/resource-types/education/> [Accessed on 21-03-2015]
- [15] Canada's Health Informatics Association. HI education programs in Canada. <http://www.coachorg.com/en/professionaldevelopment/HI-Educational-Programs.asp> [Accessed on March 21, 2015].
- [16] E. M. Borycki, N. Frisch, M. McIntyre, A. Kushniruk, Design of an innovative double degree graduate program in health informatics and nursing: Bridging nursing and health informatics. *EJBI* **7**(1) 2011, 31-39.
- [17] E. M. Borycki, N. Frisch, A. W. Kushniruk, M. McIntyre, D. Hutchinson, Integrating Experiential Learning into a Double Degree Masters Program in Nursing and Health Informatics. In *NI 2012: Proceedings of the 11th International Congress on Nursing Informatics*, American Medical Informatics Association, 2012.
- [18] Canadian Association of University Schools of Nursing and Canada Health Infoway. *Nursing informatics entry-to-practice competencies for registered nurses*, 2014.
- [19] Canadian Association of University Schools of Nursing and Canada Health Infoway. *CASN nursing informatics inventory: A report of existing teaching and learning resources*, 2014. <http://www.casn.ca/2014/11/casn-nursing-informatics-inventory-report-existing-teaching-learning-resources/> [Accessed on March 21, 2015].
- [20] Canadian Association for Schools of Nursing. Call for interested parties – Peer leaders for a nursing faculty eHealth network. <http://www.casn.ca/2014/12/call-interested-parties-peer-leaders-nursing-faculty-ehealth-network/> [Accessed on March 21, 2015].
- [21] BEK nr. 29 of 24/01/2008 <https://www.retsinformation.dk/forms/r0710.aspx?id=114493> [March 15, 2015].
- [22] I. Madsen, P. Hostrup, *Kliniske databaser. Sundhedsinformatik i Kliniske praksis*. Red. Lone W. Ertmann. 2011 Gads Forlag. (In Danish).
- [23] N. Stagers, C.A. Gassert, C. Curran, A Delphi Study to Determine Informatics Competencies for Nurses at Four Levels of Practice Nursing Research: November/December **51**(6) (2002), 383-390.
- [24] S. J. Schulte, Integrating Information Literacy into an Online Undergraduate Nursing Informatics Course: The Librarian's Role in the Design and Teaching of the Course, *Med Ref Serv Quarterly* **27**(2) (2008), 158-172.