610.
285
CON

Health Informatics

Transforming Healthcare with Technology

Moya Conrick

UNIVERSITY
OF
SOUTHERN
QUEENSLAND
LIBRARY

THOMSON
SOCIAL SCIENCE PRESS

Australia · Canada · Mexico · Singapore · Spain · United Kingdom · United States

THOMSON
SOCIAL SCIENCE PRESS

Level 7, 80 Dorcas Street
South Melbourne, Victoria 3205

Email: highereducation@thomsonlearning.com.au
Website: www.thomsonlearning.com.au

First published in 2006
10 9 8 7 6 5 4 3 2 1
10 09 08 07 06

Copyright © 2006 Peter Adkins, Diane Ayres, Cath Cameron, Stephen Chiu, Moya Conrick, Helen Cooper, Paul Donaldson, Richard Dixon-Hughes, David Evans, Sisira Edirippulige, Ian Edwards, Joanne Foster, Isobel Frean, Rod Gapp, Heather Grain, Karen Guest, Sam Heard, Evelyn Hovenga, Sheree Lloyd, Anyes Marsault, David Mitchell, Ron Natoli, Christopher Newell, Malcolm Pradhan, David Rhodes, Bob Ribbons, Bruce Roggiero, Peter Scott, Jan Stanek, Stella Stevens, Michael Strachan, Jeff Soar, Sue Walker, Jim Warren and Richard Wootton.

COPYRIGHT

Reproduction and Communication for educational purposes
The Australian *Copyright Act 1968* (the Act) allows a maximum of one chapter or 10% of the pages of this work, whichever is the greater, to be reproduced and/or communicated by any educational institution for its educational purposes provided that the educational institution (or the body that administers it) has given a remuneration notice to Copyright Agency Limited (CAL) under the Act.

For details of the CAL licence for educational institutions contact:

Copyright Agency Limited
Level 19, 157 Liverpool Street
Sydney NSW 2000
Telephone: (02) 9394 7600
Facsimile: (02) 9394 7601
E-mail: info@copyright.com.au

Reproduction and Communication for other purposes
Except as permitted under the Act (for example a fair dealing for the purposes of study, research, criticism or review) no part of this book may be reproduced, stored in a retrieval system, communicated or transmitted in any form or by any means without prior written permission. All inquiries should be made to the publisher at the address above.

Copyright owners may take legal action against a person who infringes on their copyright through unauthorised copying. Enquiries should be directed to the publisher.

National Library of Australia
Cataloguing-in-Publication data

Conrick, Moya.
Health informatics: transforming healthcare with technology.

Includes index.
For tertiary students.
ISBN 0 17 012731 1.

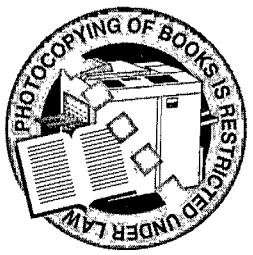
1. Medical informatics. 2. Information storage and retrieval systems – Medical care. I. Title.

610.285

Editor: Bette Moore
Project editor: Chris Wyness
Publishing editor: Elizabeth Vella
Publishing manager: Michael Tully
Indexer: Julie King
Cover designer: Olga Lavecchia
Original cover concept: Patrick Jennings
Typeset in New Aster, Gill Sans, Franklin Gothic and Times Ten by Chris Ryan
Production controller: Jodie Van Teylingen
Printed in Australia by Ligare Book Printers

This title is published under the imprint of Thomson/Social Science Press.
Nelson Australia Pty Limited ACN 058 280 149 (incorporated in Victoria) trading as Thomson Learning Australia.

The URLs contained in this publication were checked for currency during the production process. Note, however, that the publisher cannot vouch for the ongoing currency of URLs.



Contents

Preface vi
Acknowledgements viii

Part 1 – The basics of health informatics 1

1 Introduction to health informatics 2
Moya Conrick

2 IT and information management 11
Moya Conrick

Part 2 – The building blocks of health informatics 19

3 Health information interchange 20
Moya Conrick, Sue Walker, Peter Scott and Isobel Frean

4 Modelling healthcare information 39
Isobel Frean

5 Introducing databases 60
Stephen Chu

6 Knowledge management 85
Moya Conrick

Part 3 – Management considerations in health informatics implementations 97

7 Introduction to the issues in leadership and management 98
Moya Conrick and Catherine Cameron

8 Business planning and architectures 110
J. Richard Dixon-Hughes

9 Project management 128
Anyes Marsault

10 Risk management 143
Malcolm Pradhan

11 Change management 154
Rodney Gapp

12 Health economics 169
Ian Edwards

Part 4 – Health Information Systems 185

13 Systems development 186
Michael Strachan

14 Health information systems 197
Dianne Ayres, Jeffrey Soar and Moya Conrick

15 Software management 212
Jeffrey Soar and Moya Conrick

16 Electronic health records 222
Sam Heard

17 Clinical information systems 236
R.M. Ribbons

18 Decision support systems 252
Jim Warren and Jan Stanek

19 Telehealth and communication 266
Sisira Edirippuligé and Richard Wootton

20 Information across the health system 279
Moya Conrick

Part 5 – The human issues in health informatics implementations 289

21 Informatics professional roles and governance 290
Moya Conrick

22 Workforce capacity building 300
Moya Conrick

23 Human technology interfaces and ergonomics 310
Karen Guest and Moya Conrick

24 Issues of ethics and law 320
Moya Conrick and Christopher Newell

25 Consumer issues in informatics 333
Heather Grain

Part 6 – Health informatics supporting practitioners 345

26 Health education 346
Moya Conrick and Joanne Foster

27 Research and evidence-based practice 359
Evelyn Hovenga

28 Case studies from clinical practice 370
David Rhodes
Peter Adkins
Paul Donaldson
Ron Natoli
Stella Stevens
Bruce Roggiero

29 Management decision-making 378
David Evans

30 Policy decision-making 388
Sheree Lloyd and Helen Cooper

Part 7 – Pushing the boundaries 405

31 Genomics and biotechnology 406
David Mitchell

32 Gazing into the crystal ball 417
Moya Conrick with contributions from Bob Ribbons, Sisira Edirippuligé and Richard Wootton

Glossary 424
Contributors 434
Index 437

Preface

Technology is one of the most pervasive and ubiquitous tools in healthcare today. It is not only transforming healthcare but also the professions within it. For those of us teaching health informatics over the years, being unable to steer students and other interested people to a comprehensive text on the subject has been trying. The idea for this text was conceived during a meeting with a broad range of stakeholders; it was born from frustration and nurtured by a number of people engaged in health informatics – some without even realising they were!

This book provides information, knowledge and skills necessary to understand the collection, storage, retrieval, communication and optimal use of health-related data, information and knowledge. It addresses a wide range of the most essential and current areas of health informatics and is divided into seven sections:

Chapter 1 introduces the basics of health informatics to the uninitiated.

Chapter 2 discusses the building blocks of data, information and knowledge and how these are modelled and manipulated for use in health information systems.

Chapter 3 considers the issues of leadership, planning, management and economics that are central to successful informatics implementations.

Chapter 4 builds on the fundamentals to introduce the ins and outs of information systems that might be employed in or used across health institutions or practices.

Chapter 5 considers the most pressing of the human factors in informatics, including workforce, consumer and philosophical issues.

Chapter 6 presents case studies from lived experiences of health informatics. These are wide-ranging and originate from the other side of Katherine (remote Australia) to the corridors of policy-making.

Chapter 7 concludes the text with a glimpse at informatics in genomics and a healthcare future increasingly dependent on technology for quality, cost effective outcomes.

It also recognises that health informatics is a tool that supports healthcare while demonstrating the interdependent and interconnected technologies that would be falsely isolated from each other.

I am still flabbergasted that I took on this task and can only look back on the merriment of the afternoon as the answer. However, the encouragement and help received during this project have made it worthwhile and very satisfying. Finding a name for the text was not difficult in some ways but challenging in another. Information technology is obviously transforming healthcare but the name health informatics often produces a 'glazing over' from the uninitiated or enthusiastic noises from the geeks!

My hope is that this text will have wide appeal to all healthcare workers as it is written in a reader-friendly style that makes it accessible and a resource that can be used at any time. It also exposes health informatics as the tool of practice that it is and not something for only the technically savvy.

Regards,
Moya

Online reading

INFOTRAC® COLLEGE EDITION

This book also contains InfoTrac search terms at the end of each chapter. To access this material please go to: **http://infotrac.thomsonlearning.com/**

To register:

1. Go to http://infotrac.thomsonlearning.com/
2. Click on Register New Accounts
3. Enter your access code found in the InfoTrac card that comes with this text. YOU WILL NEED TO CREATE A USERNAME
4. Fill out the registration form to activate your account.

Note: After registration is complete you will only need your username and password to log on.

Acknowledgements

A book like this does not just appear. It takes a lot of effort from many dedicated people and I would like to thank them all for their hard work.

I would particularly like to acknowledge the understanding, help and support of my sons Michael and Gerard because without it this book would still be a thought. I would also like to thank my late night companion, Blu, who kept me awake by grumping at possums.

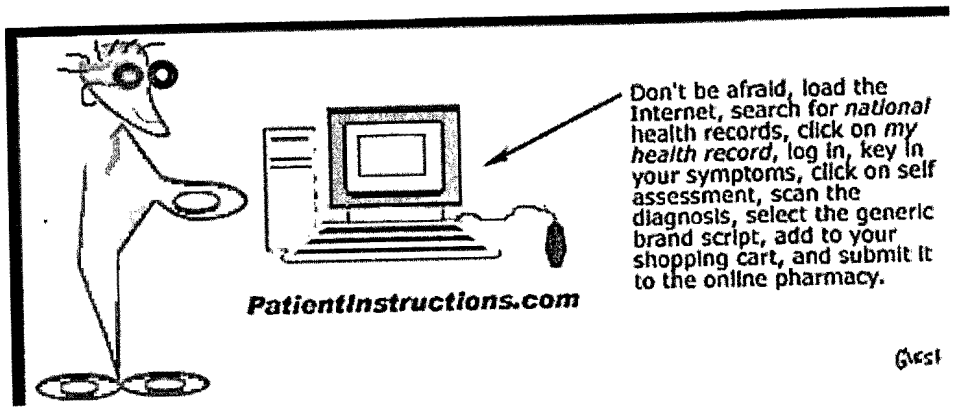
Thanks also to Karen for her great artwork and Cath for being my sounding board and proof reader. However, this book owes its existence to the many authors who have helped me to put it together in the midst of their own busy lives and day jobs.

Dedication

I would like to dedicate this book to my Dad (who did so much for me), to my Mum for her support and patience and to my sons for being there.

Part I

The basics of health informatics



Contributors

Peter Adkins	MBBS. General Practitioner. Birkdale Medical Center.
Diane Ayres	RN RM M.Info.Comm.Tech., B.Admin.(Nurs). Manager, Client Partnerships NSW Health.
Cath Cameron	RN RM PhD BN, MN, Grad Cert HE. Lecturer. Griffith University.
Stephen Chiu	PhD, FACS. Associate Professor of Health Informatics. University of Auckland, Auckland, New Zealand.
Moya Conrick	RN, RM, PhD, McIED, BN, DipAppSc. Griffith University. Convenor Nursing and Health Informatics. Chair Nursing Informatics Australia.
Helen Cooper	Assoc Dip MRA (Cumberland College of Health Sciences), B Bus (Marketing) QUT, MTM (Griffith).
Paul Donaldson	RN PNC BHlthSc(Nurs) MSchMgmt. Manager Clinical Information – Nursing. The Prince Charles Hospital.
Richard Dixon-Hughes	BSc BE(Hons) MEngSc DipLaw MLS(Hons) FIEAust CPEng FAICD MACS. Managing Director, DH4 Pty Ltd.
David Evans	MBBS, FRACMA, AFCHSE, CHE, MSIA, BBus Health Admin, Grad Dip IT, Grad Dip OHS. Medical Superintendent. Queen Elizabeth II Jubilee Hospital.
Sisira Edirippuligé	PhD, MSs. Lecturer Postgraduate Courses. e-Healthcare Center for Online Health, The University of Queensland.
Ian Edwards	B.Bus (HRM) QUT, MHA UNSW. Queensland Health is Senior Business Analyst. Health Service Executive. Lecturer, Griffith University
Joanne Foster	RN, Renal Cert, DipAppSc (NsgEdn), BN, GradDipClEdn. Queensland University of Technology. Secretary Nursing Informatics Australia.
Isobel Frean	RN, MS. Visiting Fellow. Health Informatics Research Centre. University of Wollongong.

Rod Gapp	PhD., BSc, BAppSc. Director Masters of Management (Innovation & Change) & (Research). Department of Management. Griffith University – Gold Coast.
Heather Grain	AssocDipMRA CaulfieldLincoln, GDipDataProc Caulfield. Coordinator Health informatics. School of Public Health. Consumer Representative.
Karen Guest	BA CQU, BInfTech GU. School of Information and Communication Technology. Griffith University, Nathan.
Sam Heard	MBBS, MRCGP, FRACGP, FACHI. General Practitioner. Adjunct Professor of Health Informatics at Central Queensland University. Senior Visiting Research Fellow at University College London. Vice-Chairperson of the openEHR Foundation and CEO and Clinical Director of Ocean Informatics.
Evelyn Hovenga	RN, PhD, FCHSE, FRCNA, FACHI, MACS. Professor, Faculty of Informatics and Communication. Central Queensland University. Rockhampton.
Sheree Lloyd	B Bus(Computing) QUT, Assoc Dip MRA (Cumberland College of Health Sciences). MTM (Griffith). Honorary fellow QUT.
Anyes Marsault	MMS, GradDipCommM, BBS. Project Manager PMP® – EDS Australia. [2005 PMI Project Manager of the Year]
David Mitchell	PhD, MEI. Research & Business Leader, Biotechnology & Health Informatics CSIRO.
Ron Natoli	PhC, FPS, FAIPM. Community pharmacist. Fellow/Councillor FPS of the Pharmaceutical Society of Australia NSW Branch.
Christopher Newell	AM, PhD, BA, BD, MA (Hons), MPET, FACE. Consultant ethicist and Associate Professor of Medical Ethics within the School of Medicine, University of Tasmania.
Malcolm Pradhan	MBBS, PhD. Director of Health Informatics, Faculty of Health Sciences, University of Adelaide.
David Rhodes	B Social Studies, Grad Cert Health Services Management. Director, Allied Health Services. Hunter New England Area Health Service.

Bob Ribbons	RN, ICCert, BAppSc (Nur), MEd (Computing), FACHI. Manager, Clinical Informatics, Peninsula Health. Frankston. Honorary Senior Lecturer, Faculty of Medicine, Nursing and Health Sciences, Monash University.
Bruce Roggiero	Aboriginal Community Health. Katherine District Health Services.
Peter Scott	MBBS, BA. National Centre for Classification in Health (Brisbane).
Ján Stanek	MD (Comenius Univ.), GradDipIT (UniSA). Health Informatics Research Group. Advanced Computing Research Centre, University of South Australia.
Stella Stevens	PhD. Senior Lecturer, Public Health. Griffith University Gold Coast Campus.
Michael Strachan	BBus HIM (QUT)/Grad Cert Health Informatics (Monash). Director, Health Information Services. Mater Health Services, Brisbane.
Jeff Soar	BA (Hons), GDipCommDP, GDipEd, MEd, PhD, MACS. Associate Professor, Information Systems. Director Collaboration for Ageing and Aged Care Informatics Research (CAAIR). University of Southern Queensland.
Sue Walker	MHlthSc, GradDipPH, BAppSc (MRA). Associate Director, National Centre for Classification in Health.
Jim Warren	PhD, BS. Chair of Health Informatics. University of Auckland.
Richard Wootton	PhD, DSc. Professor. Director of Research Center for Online Health.