Recommendations for Health IT Evaluation Training as a Key Prerequisite to Obtaining Evidence


* UMIT – University for Health Sciences, Medical Informatics and Technology, Austria; † Academy Medical Center, Netherlands
2 Audubon University, Denmark; ‡ University of Missouri, Columbia, USA; § Duke University, USA
3 Australian Institute of Health Innovation, Macquarie University, Australia; ‡ University of North Carolina-Chapel Hill, USA
4 University of Tampere, Finland; ‡ Hospital Juliano de Buenos Aires, Argentina; £ Keele University, U.K.
6 University of Portsmouth, United Kingdom; 7 University of Utah, USA

Background

• Health IT can improve quality and efficiency of clinical processes and health outcome [1].
• But health IT can also pose risks to patient safety [2].
• Systematic health IT evaluation studies are needed to ensure health IT quality and safety.
• Evaluation is part of an evidence-based health informatics approach [3, 4].
• Evaluation is complex, with multiple levels of evaluation of socio-technical systems, various stakeholder viewpoints, and multi-fatorial outcomes.
• To guarantee that evaluation studies are conducted in accordance with highest standards, well-trained health informatics specialists are needed.

Objectives

• To provide recommendations for the structure, scope and content of health IT evaluation courses to train these specialists.

Methods

• Joint initiative by the Working Groups on Health IT Evaluation of EFMI (European Federation for Health Informatics), AMIA (International Medical Informatics Association) and AMIA (American Medical Informatics Association).
• Analysis of already running health IT evaluation courses at universities [5].
• Analysis of textbooks on health IT evaluation [6, 7].
• Workshops at MIE 2014, MIE 2015, Medinfo 2015 and AMIA 2015 to develop and refine the recommendations.
• Recommendations were finalized by members of all three working groups.

Results

The recommendations focus on health IT evaluation courses:

• Scope: Theoretical & practical introduction into health IT evaluation.
• Level of the course: Master or postgraduate level.
• Course objective: Students should be able to:
  a) Plan their own (smaller) evaluation study;
  b) Select and apply selected evaluation methods,
  c) Perform a study and report its results; and
  d) Be able to appraise the quality and the results of published health IT evaluation studies.
• Scale of the course:
  • 6 ECTS (European Credit Transfer and Accumulation System)
  • equivalent to 4 U.S. credit hours.
• Format of the course: Modular, in-class, online or hybrid.
• Participants: Recommendations address multidisciplinary groups of students, including e.g. computer science, health informatics, medicine, nursing, social science, information sciences, or business.
• Practical training: Practical training on evaluation methods and approaches should be included.
• Prerequisites to attend the course:
  • Basic research topics, scientific evidence, research design;
  • Literature searching and critical appraisal;
  • Ethical principles;
  • Quantitative and qualitative research methods;
  • Management of research projects;
  • Clinical care delivery processes and health IT.

Mandatory Core Topics:

1. A3 Need for evidence-based health informatics (i.e. health IT and patient safety, efficiency, quality, user satisfaction), and reasons for undertaking evaluations
2. A3 Theories of evaluation (e.g. inductive or deductive, formative or summative)
3. A3a Indicators: concept, role and function
3. A3b Indicators: concept, role and function
4. A4 Building an evaluation study (e.g. information need, stakeholder analysis, tailor the evaluation, steps of an evaluation study, obtain permissions)
4. A4.1 Study designs for health IT evaluation studies (e.g. experimental, quasi-experimental, observational)
4. A5b Indicators for health IT quality (structure, process, outcome quality) and their relation to clinical indicators
4. A6 Practical training in health IT evaluation (e.g. write an evaluation plan based on a realistic case study, conduct a real evaluation project, discuss & critique a published evaluation study. May comprise frontline evaluation work in health care organizations or health IT industry.
5. A7 Reporting and publishing of an evaluation study
5. A7.1 Measuring principles (e.g. objectivity, reliability, validity of measurements, types of bias)
5. A7.2 Methods for data collection (e.g. surveys, interviews, observation, etc.)
5. A7.3 Quantitative data collection methods in health IT evaluation
5. A7.4 Qualitative data collection methods in health IT evaluation
5. A7.5 Multi-methods approaches and triangulation
5. A7.6 Quality of health IT evaluation studies
6. A8 Reporting and publishing of an evaluation study
6. A8.1 Indicator of quality (structure, process, outcome quality) and their relation to clinical indicators
6. A8.2 Reporting and publishing of an evaluation study
6. A8.3 Reporting and publishing of an evaluation study
7. A9 Evaluation frameworks for health IT evaluation
7. A9.1 Evaluation frameworks for health IT evaluation
7. A9.2 Evaluation frameworks for health IT evaluation
8. A10 Evaluation of user and technology acceptance
8. A10.1 Evaluation of user and technology acceptance
8. A10.2 Evaluation of user and technology acceptance
9. A11 Evaluation of usability
9. A11.1 Evaluation of usability
9. A11.2 Evaluation of usability
10. A12 Evaluation of technical performance
10. A12.1 Evaluation of technical performance
10. A12.2 Evaluation of technical performance
11. A13 Economic evaluation
11. A13.1 Economic evaluation
11. A13.2 Economic evaluation
12. A14 Evaluation of user and technology acceptance
12. A14.1 Evaluation of user and technology acceptance
12. A14.2 Evaluation of user and technology acceptance
13. A15 Reporting and publishing of an evaluation study
13. A15.1 Reporting and publishing of an evaluation study
13. A15.2 Reporting and publishing of an evaluation study
14. A16 Obtaining ethical approval for evaluation projects and other required permissions
14. A16.1 Obtaining ethical approval for evaluation projects and other required permissions
14. A16.2 Obtaining ethical approval for evaluation projects and other required permissions

Discussion

• Recommendation describe 15 mandatory topics that can be covered by a 6 ECTS or 4 credit hours course, and 15 optional topics.
• More than 80 international experts and workshop participants contributed to these recommendations.
• Recommendations are not meant as a cookbook, but learning objectives and student background need to be considered when designing a course.
• Recommendations include practical training, on an individual basis or in an interdisciplinary student group.
• All of these efforts shall be seen as a step towards evidence-based health informatics, see [4].

We invite all teachers of health IT evaluation courses to use these recommendations when building or updating an evaluation course, to add their course description to [5] and to report on their experiences.

Contact:
Prof. Dr. Elke Ammenwerth
Institute Biomedical Informatics
UMIT – University for Health Sciences, Medical Informatics and Technology
A-6060 Hall in Tirol, Eduard Wallnöfer-Zentrum 1
E. elke.ammenwerth@umit.at
W https://iig.umit.at
W https://iig.umit.at/efmi

References:
2. Y.Y. Han, J.A. Cusick et al., Unexpected increased mortality after implementation of a commercially sold computerized physician order entry system, Pediatrics 116(6) (2005), 1506-12.
5. EFMI WG Eval. Courseware of health IT evaluation courses, Available from: https://ig.umit.at/efmi/curricula.htm