

Adopting e-learning Standards in Health Care: Competency-based Learning in the Medical Informatics Domain

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Collaborators and acknowledgments

- Collaborators
 - Ravi Teja Bhupatiraju, MBBS – OHSU
 - Peter Greene, MD
 - Valerie Smothers, MA
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Overview of talk

- E-learning standards
- Project partners
- General approach
- Current efforts
 - Competencies
 - Content
 - Associations
 - Search system
- Future directions



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Current general e-learning standards

- Advanced Distributed Learning (ADL) SCORM (Sharable Content Object Reference Model)
- Institute of Electrical and Electronics Engineers (IEEE) Learning Object Metadata (LOM)
- IEEE Reusable Competency Definitions (RCD) Draft Standard for Learning Technology
- Simple Reusable Competency Map - proposed draft standard within the IEEE Learning Technology Standards Committee



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Partners

- MedBiquitous – www.medbiq.org
 - Dedicated to advancing healthcare education through technology standards that promote professional competence, collaboration, and better patient care
 - Accredited by the American National Standards Institute (ANSI) to develop information technology standards for healthcare education and competence assessment
- OHSU Department of Medical Informatics & Clinical Epidemiology – www.ohsu.edu/dmice
 - Interests of program include educational technology and information retrieval



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General approach

- Extend existing standards appropriate to health care uses
- Map competencies and content into standards-based metadata model for one medical specialty area (e.g., women's health) and one interdisciplinary area (e.g., medical informatics)
- Develop interface to allow searching of competencies and content as well as navigation of associations between them
- Perform usability testing of the resulting system
- Refine the metadata models and system based on results



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Effort to date

- Initial focus in medical informatics
 - Used collection of competencies, content, and LOM readily available to us
 - AMIA-OHSU 10x10 course
- Subsequent clinical focus in women's health
 - Competencies from Association of Professors of Gynecology and Obstetrics (APGO)
 - Women's Health Care Competencies for Medical Students
 - Content from Center for Collaborative and Interactive Technologies, Baylor College of Medicine
 - Slide sets, review articles, and other materials



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Medical informatics content and competencies

- Content from general introductory course in medical informatics
- Competencies based on skills and knowledge aimed at health care professionals taking on increasing roles in health IT initiatives



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10x10 course content

Teaching Modality	File format
Flash-based voice over Powerpoint lectures	.ZIP, launched from a .HTML page
Slide handouts	.PDF
Slide reference lists	.PDF
Reading assignments	.PDF or in a paper textbook
Discussion questions	.DOC
Multiple-choice self-assessment quiz	.DOC



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Units of 10x10 course

1. Overview of Discipline and Its History
2. Biomedical Computing
3. Electronic Health Records
4. Decision Support and Health Care Quality
5. Standards, Privacy and Security, Costs and Implementation
6. Evidence-Based Medicine and Medical Decision-Making
7. Information Retrieval & Digital Libraries
8. Bioinformatics
9. Imaging Informatics and Telemedicine
10. Other Informatics: Consumer Health, Public Health, and Nursing
11. Organizational Management in Informatics
12. Career and Professional Development



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Details of Unit 3

Content	Description	Objects (files)
3. Electronic Health Records	Unit level material: reference lists, discussion questions, self-assessment quiz	Unit 3.doc, Unit 3.enl
3. Electronic Health Records	Lecture 1 of 8 with presentation and slide handout	3.0.zip, 3.0.pdf
3.1 Clinical Data	Lecture 2 of 8 with presentation and slide handout	3.1.zip, 3.1.pdf
3.2 History and Perspective of the Health (Medical) Record	Lecture 3 of 8 with presentation and slide handout	3.2.zip, 3.2.pdf
3.3 Potential Benefits of the Electronic Health Record	Lecture 4 of 8 with presentation and slide handout	3.3.zip, 3.3.pdf
3.4 Definitions and Key Attributes of the EHR	Lecture 5 of 8 with presentation and slide handout	3.4.zip, 3.4.pdf
3.5 EHR Examples	Lecture 6 of 8 with presentation and slide handout	3.5.zip, 3.5.pdf
3.6 Current Status of the EHR	Lecture 7 of 8 with presentation and slide handout	3.6.zip, 3.6.pdf
3.7 Health Information Exchange	Lecture 8 of 8 with presentation and slide handout	3.7.zip, 3.7.pdf



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Example competencies and linkage to content

Competency	Content
Evaluate electronic health record systems based on their ability to meet the needs of a given clinical setting.	Unit 3 and sections 3.1-3.5
Recognize barriers to implementing electronic health records (EHRs) and formulate strategies to overcome those barriers.	Unit 3 and section 3.6
Formulate strategies to achieve health information exchange (HIE) and Regional Health Information Organizations (RHIOs) in one's community and what is necessary to achieve them.	Unit 3 and section 3.7



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Example competency definition

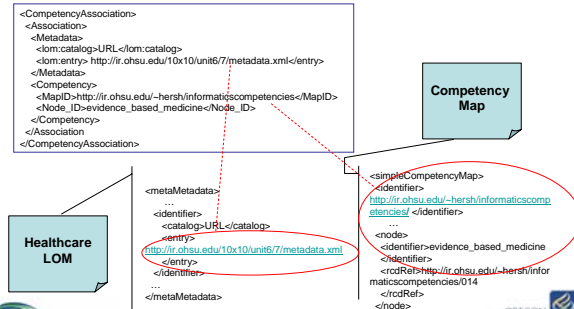
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<langstring>Evaluate electronic health record systems based on their
ability to meet the needs of a given clinical setting.</langstring>
</description>
</rdceo>
```



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Competency associations



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Accessing the content and competencies

- Medical Education Resources Gateway (MERG)
- Python-based interface that accesses eXist XML database through Web services (XML-RPC) approach
- Allows searching on competencies and LOM records, with navigation by linked associations

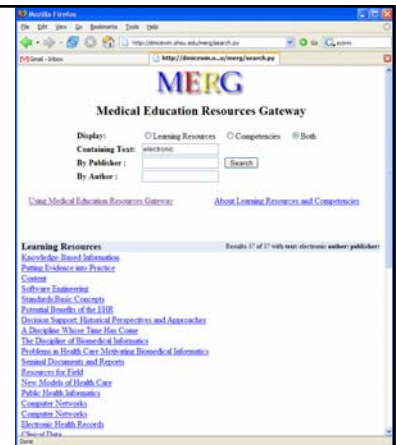


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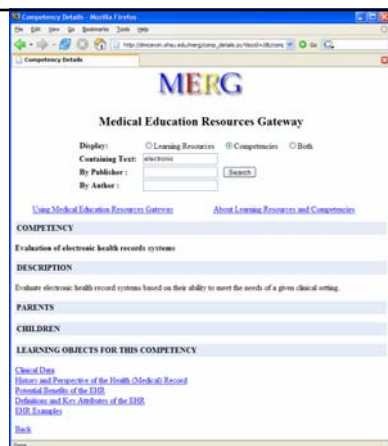
MERG interface

- Can search for competencies, content, or both
- Can search over text, publisher, or author
- Output displays LOM records and/or competencies
- Click on link to view full record



Displaying a competency

- Selected *Evaluation of electronic health record systems*
- Shows definition, hierarchical context (if applicable), and associated LOM records for competency



Displaying a LOM record

- Selected *Definitions and Key Attributes of the EHR*
- Shows link to learning object, metadata, and competencies associated with that learning object



Displaying another competency

- In women's health

The screenshot shows the 'Competency Details' page on the MERG website. The page title is 'Medical Education Resources Gateway'. Below the title, there are search filters for 'Display:' (Learning Resources, Competencies, Both), 'Containing Text:', 'By Publisher:', and 'By Author:'. A search button is present. The main content area is titled 'COMPETENCY' and lists 'Contraceptive Practices, Family Planning, and Unintended Pregnancy'. Below this, there is a section for 'LEARNING OBJECTS FOR THIS COMPETENCY' with a list of links to various articles and resources related to contraceptive practices and family planning.

Displaying another LOM record

- In women's health

The screenshot shows the 'LOM Details' page on the MERG website. The page title is 'Medical Education Resources Gateway'. Below the title, there are search filters for 'Display:' (Learning Resources, Competencies, Both), 'Containing Text:', 'By Publisher:', and 'By Author:'. A search button is present. The main content area is titled 'LEARNING OBJECT' and lists 'Contraception During Breastfeeding'. Below this, there is a section for 'METADATA' with fields for Title, Author, Publisher, Creator, Content, Cost, Copyright, and Contact. The 'COMPETENCIES FOR THIS LEARNING OBJECT' section lists 'Reproduction, Contraception, and Sterilization' and 'Contraceptive Practices, Family Planning, and Unintended Pregnancy'.

Future directions

- Usability testing to make sure real users can understand conceptual model and actual implementation
- Expansion to new subject domains
- Release of software under open-source model
- Promotion of LOM and competency framework as standard for health care education in collaboration with other MedBiquitous efforts

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The bottom of the slide features the MedBiquitous logo on the left and the Oregon Health & Science University logo on the right.