Canadian Pharmacy Informatics Online: Innovation and Inception

Personal health portal
Pharmacy management system
EHR

e-prescribe
DIS
CDS
EMR
iPad
CPOE
Social media
e-health
Smartphone

An Update on the AFPC -
Infoway Online Educational
Program Initiative

Presentation Outline

1. **Welcome and Introductory Remarks**

   - Donna Pipa, Project Manager

2. **Clinicians in Training Project**

   - Valerie Leung, Canada Health Infoway

3. **AFPC Project Background and Update**

   - Donna Pipa, Project Manager

4. **Design and Development**

   - Marie Rocchi, Faculty Lead and Audience

Acknowledgements

Project Sponsor:

Harold Lopatka, AFPC Executive Director

Funding:

Canada Health Infoway

Canada Health Infoway's Clinicians in Training Initiative

Valerie Leung, B.Sc.Phm., M.B.A.

Clinical Leader

Canada Health Infoway

AFPC Project Background and Update

Donna Pipa, B.Sc.Pharm, FCSHP

Project Manager

AFPC - Canada Health Infoway

Educational Program for Optimizing the Use of Pharmacy Information and Information Technology

Preparing Students for an e-Health World

William Gibson who coined the term 'cyberspace' famously said, "The future is already here - it's just not evenly distributed." Canadians expect a connected world – whether it's online banking, online shopping or texting everyone they know. So when it comes to bringing the same level of connectivity to our healthcare system, one key enabler is to ensure clinicians-in-training are prepared to practice in modern, technology-enabled environments." (Blog, Canada Health Infoway")

http://www.youtube.com/watch?v=gxz9ZVvduGc

Project Overview (1)

- Goal
  - Develop national online education program re: optimal use of pharmacy/health information and information technology

- Partners
  - AFPC (and other pharmacy stakeholders)
  - Canada Health Infoway (funder)
  - Harold Lopatka – Project Sponsor

Project Overview (2)

Key components of the project include:

- Literature Review

- Development and implementation of a national educational program *(including learning and teaching aides and tools)*

- Establishment of a national pharmacy information technology graduate student award

- Recognition and evaluation of the project

Project Oversight

Steering Committee

- Provides direction & oversight
- Provides input re: resources/SMEs
- Committee members
  - AFPC   - CPhA
  - ADPC   - CSHP
  - CAPSI   - CPTEA
  - CACDS   - Infoway
- Subcommittees, working groups

Project Deliverables

- Literature review

- PIT Glossary/dictionary

- PIT Competency framework, assessment tool

- On-line educational program and teaching guide

- English and French Documents

- Graduate student award

- Communication – updates, orientation and dissemination of info through various means

Project Schedule

- 2 year period, target fall of 2013 with release of the online program.

- Key phases are:
  - initial / setup
  - research (initial / synthesis)
  - educational programming (content development / online program)
  - project evaluation

Educational Program

- Competency based
- Array of modules/units/chapters
- Faculties could pick and choose
- 'Sandbox' environment where possible

Challenges

- Variation in state of implementing electronic health record and expanded scope of pharmacist practice between provinces.

- Variation in teaching and learning approach across faculties.

- Curriculums are crowded - difficult to make additions.

- Finding faculty with expertise

- Need to consider future enhancements and ongoing support

Important Elements of Project

- **Creation of a unique Canadian Competency Framework**
- Analysis of Faculty and Student Needs
- Selection of Learning Management System (LMS)
- Student Award Recipients and Engagement
- Development of a Content, Theme and Design Matrix
- Innovative Pedagogy with Virtual Patients
- Intersection of project with Medicine and Nursing

Competency Framework Development (Phase 1)

An initial draft set of entry to practice competencies for pharmacy students enrolled in first professional degree programs in Canada was developed through:

- Literature review for competency statements and frameworks, and review of existing, validated, relevant competency frameworks including:

1. Canadian Association of Schools of Nursing (CASN, 2012)
2. Association of Faculties of Pharmacy of Canada (AFPC, 2010)
3. COACH (Canada's Health Informatics Association, 2009)
4. Building Core Competencies in Pharmacy Informatics (Fox, 2010, American Pharmaceutical Association)
5. American Medical Informatics Association (AMIA, 2012)

Competency Framework Development (Phase 1)

- Compilation of a hybrid set of competencies and competency indicators felt to be relevant to the project

- Consideration of pharmacy-specific context and modification of competencies where appropriate

- Survey created to determine the relevance and priority of each indicator

- Survey participants were asked to:

1. Determine the content validity of each competency (and accompanying indicator) statement and,

2. Prioritize the competencies (and indicators) to drive the next phase of program design and development

Competency Framework
- *Three Competencies and 31 Competency Indicators* -

1. ## Information and knowledge management

   Uses relevant information and knowledge to support the delivery of evidence-based patient care

2. ## Professional and regulatory accountability

   Uses ICTs in accordance with professional and regulatory standards and workplace policies

3. ## Information and communication technologies

   Uses information and communication technologies in the delivery of patient/client care

Competency Framework (Phase 2)

- Some rewording and re-ordering of competency indicators occurred based on feedback

- Please refer to Brochure on tables

- The second phase involved the development of content domains, and sequencing and design of the educational program.

Design and Development

Marie Rocchi, B.Sc.Phm., M.Ed.

Faculty Lead

Leslie Dan Faculty of Pharmacy, University of Toronto

Conference Theme: Innovation
A new method, idea, product

1. Inception
2. Input → Engagement
3. Informatics
4. Instructional Design → Participatory
5. Inspiration
6. Influences
7. Incubator
8. Interactive
9. Imprimatur

Conference Theme: Innovation

1. **Inception**
2. **Input → Engagement**
3. **Informatics**
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Inception

"An act, process, or instance of beginning" *(Merriam Webster)* or, "The beginning of something, such as an undertaking" *(Free Online Dictionary)*

Plot Synopsis: DiCaprio commits corporate espionage by infiltrating the subconscious of his targets. He is offered a chance to regain his old life as payment for a task considered to be impossible: **"inception", the implantation of another person's idea into a target's subconscious** *(IMDb = Internet Movie Database)*

Inception: the Sequel

- Starring the audience!
- Reclaim education and join the crew
- Produced by Harold Lopatka

- Cast includes authors, student award winners, reviewers, contributors, and end-users
- We even have critics *(evaluation phase)*
- Like the movie's plot *(levels of dreams),* the e-resource *(educational program)* will provide "layers upon layers" of education that will wrap around the content *(and the competency framework)*

Activity #1 – Inception

- Each table has coloured post-it notes
- Individual and/or Group Activity
- Over the course of the next hour, affix to flip chart/wall beside presenters

What is the one idea you would most like to implant in the students' subconscious?

Thought Starter: Informatics

- **Health Informatics** *(also called biomedical informatics)* is the "optimal use of information, often aided by the use of technology, to improve health, health care, public health, and biomedical research" *(Hersh, 2009, includes Shortliffe)*

- **Pharmacy Informatics** is the "use and integration of data, information, knowledge, technology and automation in the medication use process for the purpose of improving health outcomes" *(American Society of Health-System Pharmacists, 2007)*

Conference Theme: Innovation

1. Inception
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4. **Instructional Design → Participatory**
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Instructional Design Theory

- Dick & Carrey (1990) model is sequential & systematic

Dick and Carey Instructional Design Model

- Willis (2000) is recursive & reflective (R2D2)
- Involves students as participants
- Multiple stakeholders are consulted (organic)

ADDIE Model

- **Analysis (learners, task, context)**
- **Design (activities, content, sequencing, assessment)**
- Development (production of materials)
- Implementation (delivery of e-resource/program)
- Evaluation (of learners and e-resource)

Iterative process (recursive and reflective)

User testing

Definition of Instructional Design

"the systematic and reflective process of translating principles of learning and instruction into plans for instructional materials, activities, information resources, and evaluation" (Smith and Ragan, 2005)

More simply put…..creating conditions for learning.

Noted: ISD 1/3 project management, 1/3 process driven, 1/3 creative

Bottom Line(s) for Instructional Designers

"Could they demonstrate that they have achieved the learning reflected by this goal if their lives depended on it?" (Rothwell & Kazanas, 1992)

- Health care often considered high risk *(comparisons made to airline industry)*

- Need for checklists & practice, balanced with hours of training *(not unlike pharmacy education)*

Flight Simulation Training →

Competency Framework (Phase 2)
(From Inception to the Matrix)

- Validated Competency Framework
- Content, Theme, and Design Matrix developed

→ Harold Lopatka's original nine

Domains consolidated to 6

Content, Theme, and Design Matrix

- Evidence informed
- Based on Competency Framework
- Six Domains with topics/chapters
- Linked to CanMEDS roles
- Foundational and Advanced Topics
- Common Themes in Canadian healthcare
- Design Themes across Domains
- Prequel Domain *(includes Faculty Guide, Project Background and Program Development)*

Domain Authors
Following Call for Authors February 2013

- **Neil de Haan:** Information Management and Technology
  - *BC Cancer Agency, University of Victoria*

- **Lisa Bishop:** Knowledge Management and Technology
  - *Memorial University*

- **Jeff Barnett:** Privacy, Security, and Confidentiality
  - *BC Cancer Agency, University of Victoria*

- **Kelly Grindrod:** Consumer Health Informatics
  - *University of Waterloo*

- **Jason Perepelkin:** Management, Optimization and Leadership – *University of Saskatchewan*

- **Marie Rocchi:** Concepts and Context, Faculty Guide, Editor and Instructional Designer – *University of Toronto*

Undergraduate Student Award Winners
Participatory ID involves Students....

- **Danny Wong** *(University of British Columbia)*

- **Jereme Parenteau** *(University of Alberta)*

- **Phillip Curran** *(University of Saskatchewan)*

- **Chelsea Barr** *(University of Waterloo)*

- **Patrick Monaghan** *(Dalhousie University)*

...27 applicants, ratings, interviews, selection.

Student Roles

1. **Archivist** (version control, glossary, content management)
2. **Researcher** (content, resources, annotations)
3. **Multimedia production** (animation, video, audio, images, lecture capture)
4. **MCQs** (item writing, blueprinting with Role 14)
5. **Writing and copy-editing**
6. **Leveling & Relevance** – all
7. **Training Manuals, Faculty Support**
8. **Sys Admin** (set up, enrolling users, support)
9. **Design/build modules** (programming, author-ware)
10. **Analytics** (users, feedback, evaluation)
11. **Translation Assistance** (French)
12. **Student Engagement** (marketing, user testing)
13. **Innovation** (apps, virtual patients, e-CPS workbook, mobile health)
14. **Blueprinter** (competency framework/content/learning objectives)

Reviewers

- Terry Damm *(University of Saskatchewan)*
- Nancy Kleiman & Christine Davis *(University of Manitoba)*
- Stephanie Young *(Memorial University)*
- James McCormack *(University of British Columbia)*
- Eric Schneider *(University of Waterloo)*
- Jon Paul Marchand *(UBC)*
- Clinicians

Contributors

- Doris Nessim – Automation in Acute Care and Ambulatory Settings
- Sharon Walsh *(University of Alberta)* – Personalized Medicine
- Hilary Watson *(University of British Columbia)* – Virtual Patients and Self Care
- Danny Ho *(University of Waterloo)* – Domain 2

Activity #2: To the Matrix!
Flip charts, copies of Matrix available

Consider...from a course, division, or faculty perspective:

- Does the content reflect your educational needs? Does it fill a gap?

- Is the content forward thinking?

- Should the order and sequencing matter?

- Is anything missing? Is anything redundant?

- Are the CanMEDS roles congruent with the domains?

After the activity....the Advance Screening!

ADDIE Model

- **Analysis (learners, task, context)**
- **Design (activities, content, sequencing, assessment)**
- Development (production of materials)
- Implementation (delivery of e-resource/program)
- Evaluation (of learners and e-resource)

Iterative process (recursive and reflective)

User testing

Inspiration

Influences

Common Design Elements for Domains

1. Advance Organizer *(overview, objectives, authors)*
2. Pre-Test *(multiple choice questions)*
3. **Content *(text, images, videos, URLs)***
4. Virtual Patients, Clinicians, & Faculty
5. Case Studies, Scenarios & Worked Examples
6. Learning Activities & Faculty Guide
7. Key Points and Domain Summary
8. Post-Test
9. Unit Evaluation
10. Glossary

Tab Display, Use of Images, Text, Bullets, Ample White Space *(Cognitive Presence)*

Reading/Article Embedded *(Cognitive Presence)*

Embedded Videos and URLs *(Cognitive Presence using credible Multi-Media Learning Objects)*

Lecture Capture *(Teaching Presence)*

Inspiration – RNAO e-Health for Every Nurse & At the Point of Care *(Book Display)*

Common Elements for Domains & Chapters

1. **Advance Organizer** *(overview, objectives, authors)*
2. Pre-Test *(multiple choice questions)*
3. Content *(text, images, videos, URLs)*
4. Virtual Patients, Clinicians, & Faculty
5. Case Studies, Scenarios & Worked Examples
6. Learning Activities & Faculty Guide
7. Key Points and Domain Summary
8. Post-Test
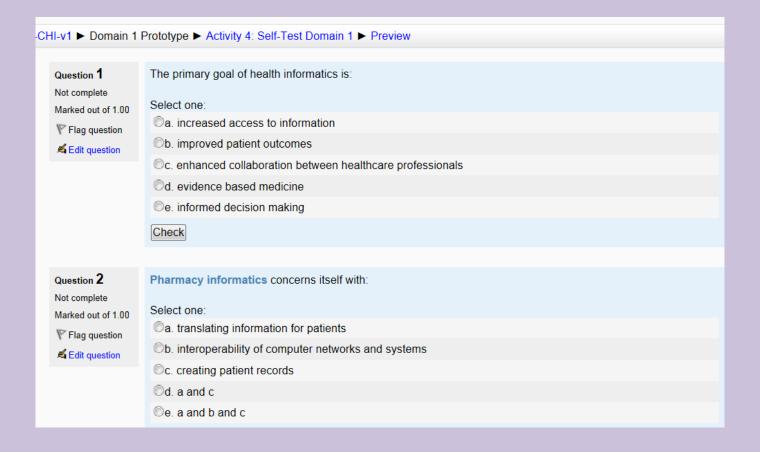9. Unit Evaluation
10. **Glossary**

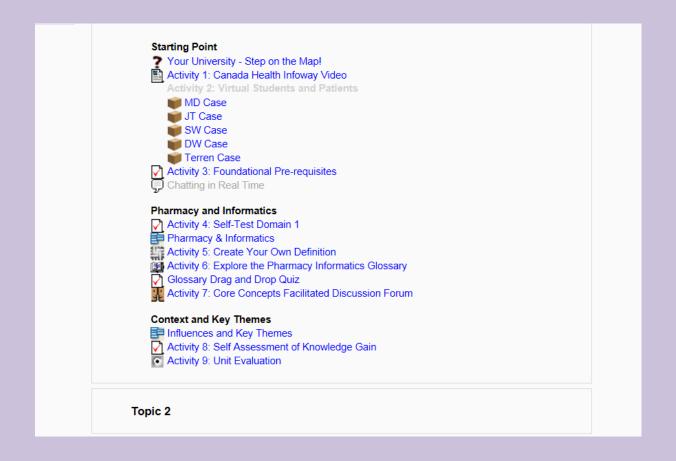# Enabled Glossary provides "just in time" leaning and reinforcement of concepts (van Merriënboer, 2001)

Common Elements for Domains & Chapters

1. Advance Organizer *(overview, objectives, authors)*
2. Pre-Test *(multiple choice questions)*
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Results Tracked in LMS Analytics

Question 1

Not complete

Marked out of 1.00

⚑ Flag question

✎ Edit question

The primary goal of health informatics is:

Select one:
- ○ a. increased access to information
- ○ b. improved patient outcomes
- ○ c. enhanced collaboration between healthcare professionals
- ○ d. evidence based medicine
- ○ e. informed decision making

[Check]

Question 2

Not complete

Marked out of 1.00

⚑ Flag question

✎ Edit question

Pharmacy informatics concerns itself with:

Select one:
- ○ a. translating information for patients
- ○ b. interoperability of computer networks and systems
- ○ c. creating patient records
- ○ d. a and c
- ○ e. a and b and c

Modular, Scalable, and Interactive Functions (Icons)

Common Elements for Domains & Chapters

1. Advance Organizer *(overview, objectives, authors)*
2. Pre-Test *(multiple choice questions)*
3. Content *(text, images, videos, URLs)*
4. **Virtual Patients, Clinicians, & Faculty**
5. Case Studies, Scenarios & Worked Examples
6. Learning Activities & Faculty Guide
7. Key Points and Domain Summary
8. Post-Test
9. Unit Evaluation
10. Glossary

Instructional Analysis
(involves asking questions)

- Environment (school, work, home)
- Task (new information, skills)
- Setting (context of application)
- Attitudes, time, learner characteristics
- Prior knowledge/experience

Two Towers
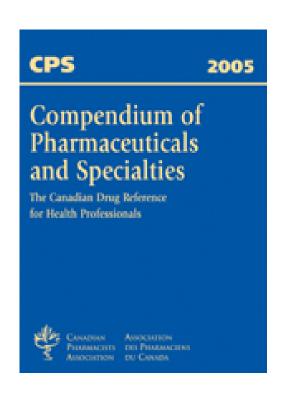## Observation vs. Telecommunications

Analysis – Learners

- Digital natives (Marc Prensky) – *"Don't bother me Mom, I'm learning"*

- <u>Computer literacy</u> → foundational pre-requisites

- <u>Health Information literacy</u>

 → Health science students had difficulty discerning primary from secondary sources, using Boolean operators (Stellefson, 2012)

→ Hayward (Alberta) has developed curriculum

→ HIL = Informational knowledge, attitudes, skills required for safe, effective, collaborative healthcare practice in a digital workplace

Things a Digital Native has said to me…

1. That's too much phone for you

2. I'm having a Skype beer with Daniel

3. My generation knows more about privacy settings than yours

← *Facebook page with caption "attempting adulthood"*

RIP Monographs…

Without Prejudice

Learner analysis means not judging them but considering conditions for learning

- The information assaulted me!
- I don't want to look at a computer screen for information – I'd rather see it on a small screen, like my phone.

Burnette (2011) online elective course in MI – students found readings dry and redundant but appreciated flexibility of asynchronous & self-paced format - learners "were pleasantly surprised" & elective filled void

Health Information Literacy

HIL Competencies

Healthcare decision-makers must:

1. Access to relevant information rapidly.

2. Be able to discern better from worse information.

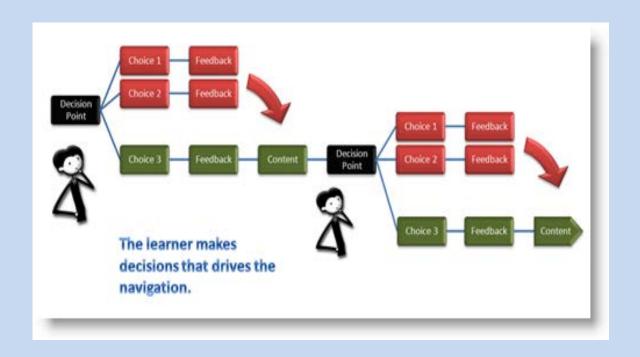3. Manage applicable information in support of best practices.

Virtual Patients (1)

- Used extensively in medical education
- Rich learning resources encourage medical students to interact and learn deeply (Cook, 2008)
- Low fidelity *(vs. high fidelity e.g. SPs)*
- Model decision making & enhance development of mental models *(novices vs. experts)*
- Templates adversely impact maturation of the decision-making process and development of skills (Mintz et al, 2009)
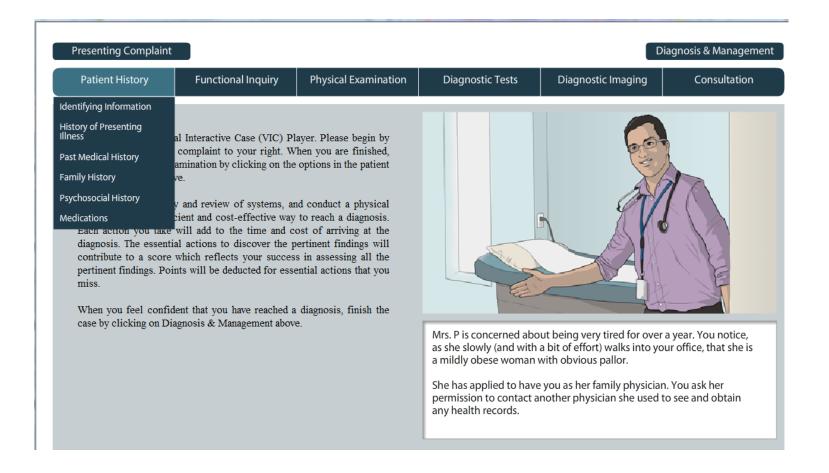
VPs 2

- Four Generations:
  1. linear
  2. branching and linking
  3. immersive, full multi-media
  4. scenario based, modular, integrated

- Use in pharmacy education in North America quite limited
- Virtual Clinicians, Virtual Faculty, Virtual Students?

Decision Making Logic
(Storyboarding Cases)

Inspiration (AFMC VP Challenge)

AFMC Neuroscience of Addictions
http://emodules.med.utoronto.ca/addiction/

Index Case & 4 Family Members
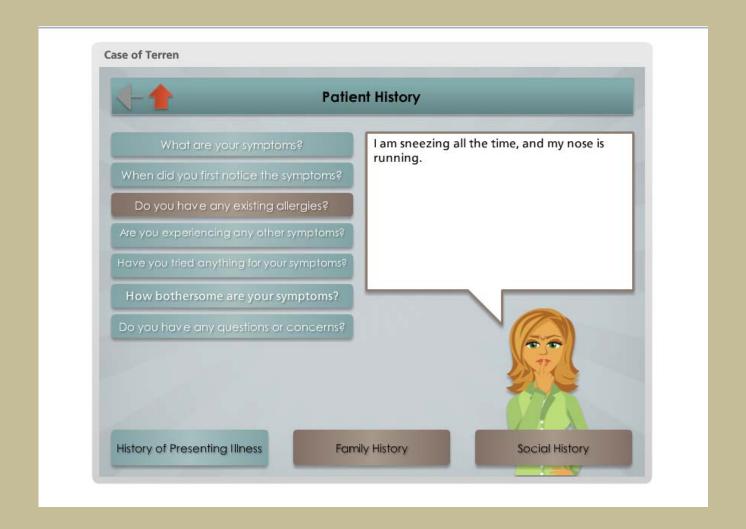
4C/ID Model of Supportive Information
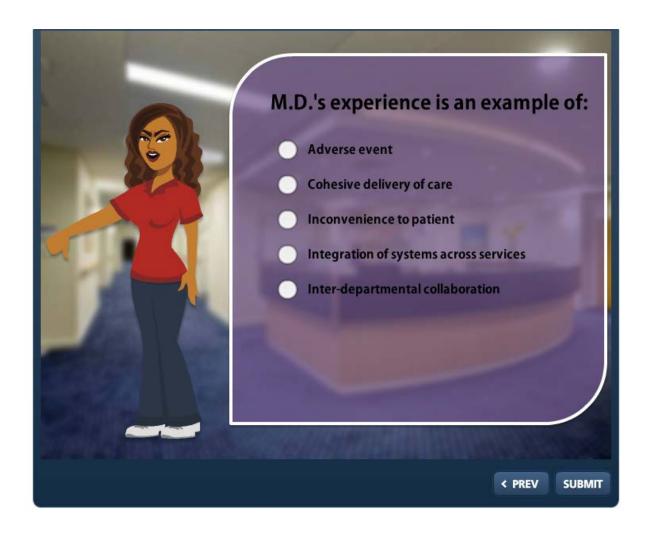
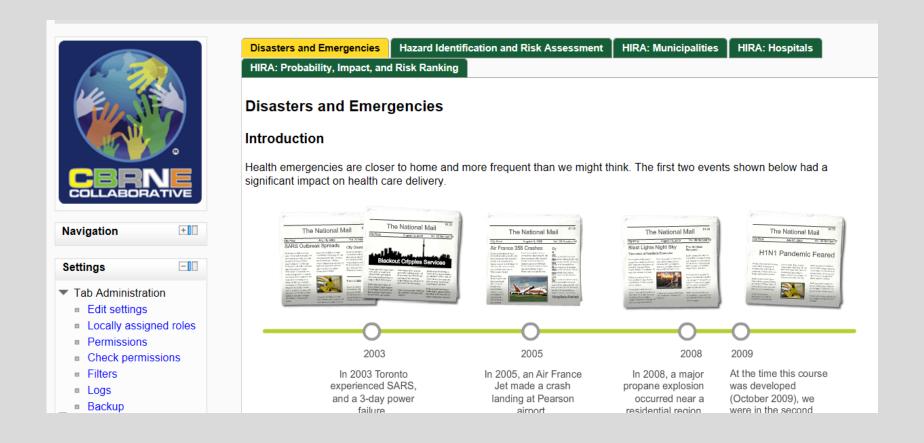**Authentic Practice Cases**

Meet AFPC's VP

Pharmacy Specific Context
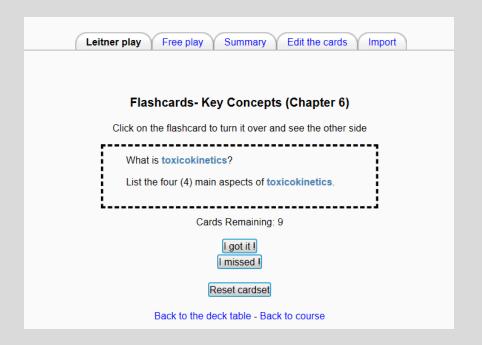
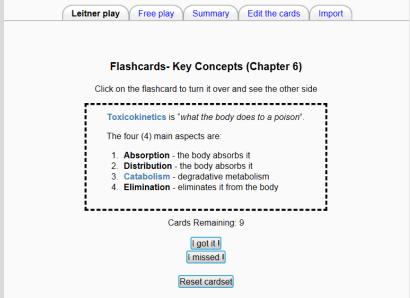# Interoperability Patient Case

Influences

Flashcards
Serious games in higher education

Flashcards

Conference Theme: Innovation

1. Inception
2. Input → Engagement
3. Informatics
4. Instructional Design → Participatory
5. Inspiration
6. Influences
7. **Incubator**
8. **Interactive**
9. **Imprimatur**

Analysis – Context

- End users are both faculty members and students
- Acceptability/access/use by students and faculty are equally important
- Desirable attributes:
    - a) Usable in its entirety as a cohesive program
    - b) Usable as discrete modules within courses or streams
    - c) Combination of a and b → rationalized by each school
    - d) For inter-institutional collaboration
- Other potential audiences: pharmacists, pharmacy technicians, & other CITs (medicine, nursing, PTs)

Activity #3 – Exploring Conditions for Use within Faculties

1. In its entirety? e.g. pre-experiential boot-camp? (*James McCormack, also offered by Olavo Fernandes*)
2. Embedded in courses?
3. As an Elective?
4. Combination of the above?

- Tracking of results *(participation, formative or summative?)*
- Compatibility with institutional LMSs

- Type of interactivity:
1. Student/Content
2. Student/Instructor (online or F2F)
3. Student/Student

Choosing an LMS – Environmental Scan

School	Learning Management System
University of British Columbia	Blackboard Connect (in transition from WebCT)
University of Alberta	Moodle (in transition from Web CT)
University of Saskatchewan	Blackboard
University of Manitoba	Desire2Learn (in transition from Angel)
University of Waterloo	Desire2Learn (from Angel)
University of Toronto	Blackboard (some Moodle)
Laval University	ENA (environnement numérique d'apprentissage)
University of Montreal	Web CT
Dalhousie University	Blackboard
Memorial University	Desire2Learn

Choosing an LMS – Environmental Scan

- All faculties have converted from one system to another → natural evolution

- Educational technology decisions a function of institution's IT plan, resources, pedagogical orientation (Bates, 2003)

- "Digital divide": between students and faculty members found in both DE literature and project literature review

- No pan-Canadian solution exists

- Nature of project is unique and solution may be a departure from the norm

- Open Source solution – Moodle (<u>m</u>odular <u>o</u>bject-<u>o</u>riented <u>d</u>ynamic <u>l</u>earning <u>e</u>nvironment)

Implementation Challenges Foreseen

- Technical issues (access by learners)
- Support issues (for faculty, learners)
- Each Faculty's approach
- Each course's approach (relative to nature of material and skill development)
- Anticipating numbers of learners
- Classroom vs. Online vs. Experiential
- Training/sharing with preceptors
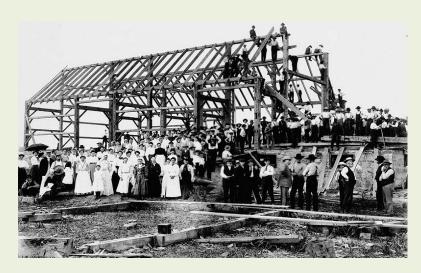
e-Resource Development

- Collective action by a community
- Members enlisted
- Ambitious project
- Necessary and unique
- Reciprocal opportunity for each member or program to contribute and use
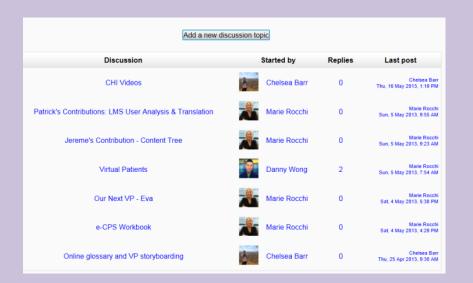
This is the definition of …

Barn Raising

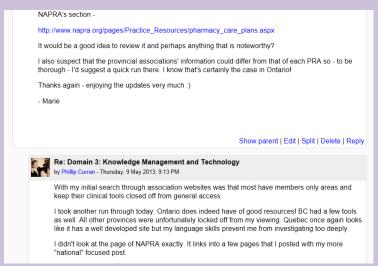## *Modern Day Equivalent: Habitat for Humanity*

- One or more people with prior experience or with specific skills are chosen to lead the project.
- Most barn raisings were accomplished in June and July when the mostly agrarian society members had time
- Timber for the framing was mostly produced in the winter by the farmer and his crew

City of Toronto Archives

Project Workspace

Coming Soon to an LMS Near You

AFPC_640.360_v3.mp4

Incubator for Innovation
Guiding Principles for e-Resource

- Intellectual integrity preserved
- Acknowledgement of scholarly contributions
- Instructional Voice *(to minimize transactional distance)*
- Authenticity and application
- Relevance of material for all pharmacy students across Canada
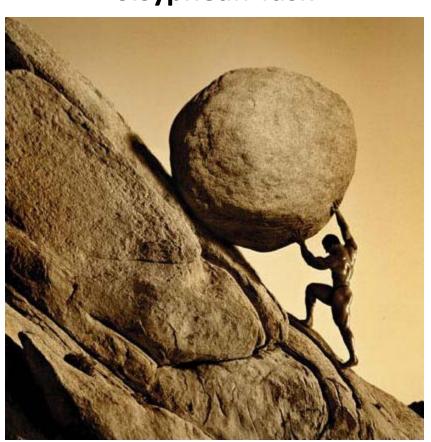- Foundational level; unifying themes
- Various audiences

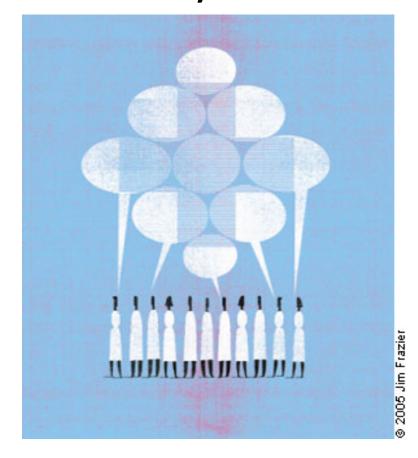# Canadian Health Education Commons

https://chec-cesc.afmc.ca/

Imagining the Online Resource as Supporting Learning and Teaching

Sisyphean Task

Community of Practice

© 2005 Jim Frazier

Conclusion

You are invited to join the collaborative

- Contribute
- Review
- User-testing
- Utilize
- Evaluate

Please contact: marie.rocchi@utoronto.ca

Contact Information

- Harold Lopatka, AFPC Executive Director
  email: hlopatka@telus.net

- Donna Pipa, Pharmacists in Training Project Manager
  email: pipa@telus.net

For additional information about project see summary on AFPC website:
http://www.afpc.info/content.php?SectionID=4&ContentID=165&Language=en

Online Learning: A Definition

"the use of the Internet to access learning materials; to interact with the content, instructor, and other learners; and to obtain support during the learning process, in order to acquire knowledge, to construct personal meaning, and to grow from the learning experience" *Ally, 2008*

- *Also referred to as "computer mediated instruction"*

- *Other key terms:*
1. *Distance Education (implies a remove by space and time)*
2. *Hybrid Approach (classroom and online)*
3. *Synchronous and Asynchronous*

Key Principles

Principle 1: Congruence between objectives, activities and assessment

Principle 2: Advocacy of the learner as focus of instruction

Principle 3: Supports effective, efficient and appealing instruction

Common Concerns with Distance Education

- Engagement of learners, including yourself
- Face-to -face is more familiar, much more experience with 1:1, small group, large class size
- Past experience: not enough structure in discussion forums or the course material

Instructional Strategy Selection

- Content (size of segments, embedded activities or lecture)

- Activities (supplement or primary means, read, discuss, do)

- Sequence (expository or discovery)

- Media, group or individual activities

Transactional Distance

- Refers to psychological and communication distance between learner, peers, content, and instructors in distance education settings (Moore, 1980)

- Relationship to structure and dialogue (as one increases, the other decreases; getting the balance right is the holy grail of online instructional design)

- Degree of learner autonomy/control is important (ability to move ahead without course content being unavailable, or interact with content at own pace)