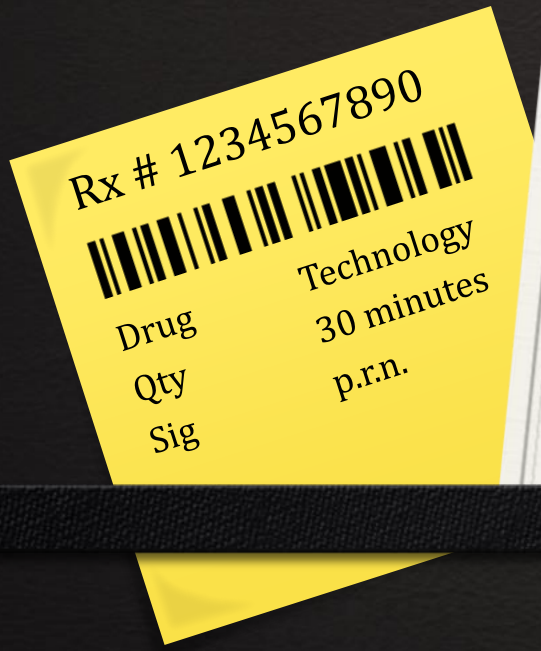


Engaging Technology and Informatics Through Learning and Doing

Sharing Experiences From University of Waterloo School of Pharmacy

Danny Ho, MASc, PhD – CPERC 2013

Background & Perspective

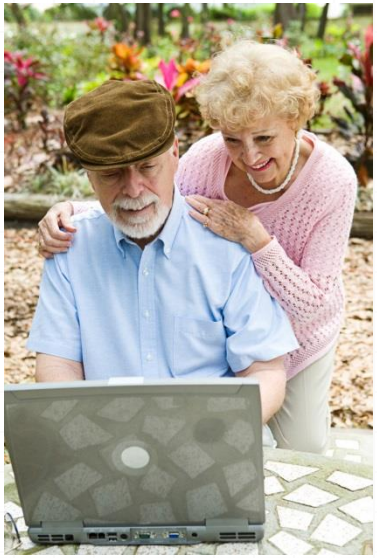
- Did not take high school biology, up to grade 10 Chemistry
- Undergrad Year 1 Chemistry, because I had to…
- Bachelors & Masters in Systems Design Engineering, University of Waterloo, specialized in Human Systems and Interface Design
- PhD in Information Systems, UMBC, proposed information sharing and group collaboration framework inspired by healthcare practitioners' use of ICT in the healthcare setting
- Previously held roles at pharmacy technology companies, currently holding a technology role in the retail sector
- I salivate at any opportunity to design technology that empowers end users!

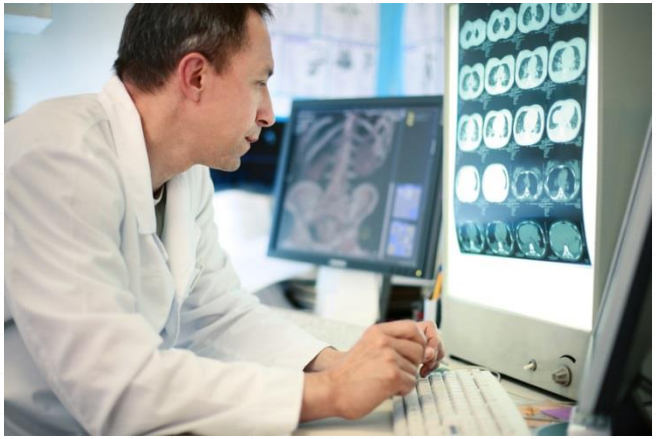
Overview

- Seizing an opportunity
- Balancing didactic & project-based learning
- Course topics & design
- Student deliverable examples!!
- Not without challenges
- Future steps and considerations

Opportunity

- Patients are becoming more tech-savvy and internet connected
- Cost of doing, and retaining, business is steadily rising
- Computer literacy in pharmacy profession is traditionally low *
- Pharmacists can exploit technology to be more competitive!

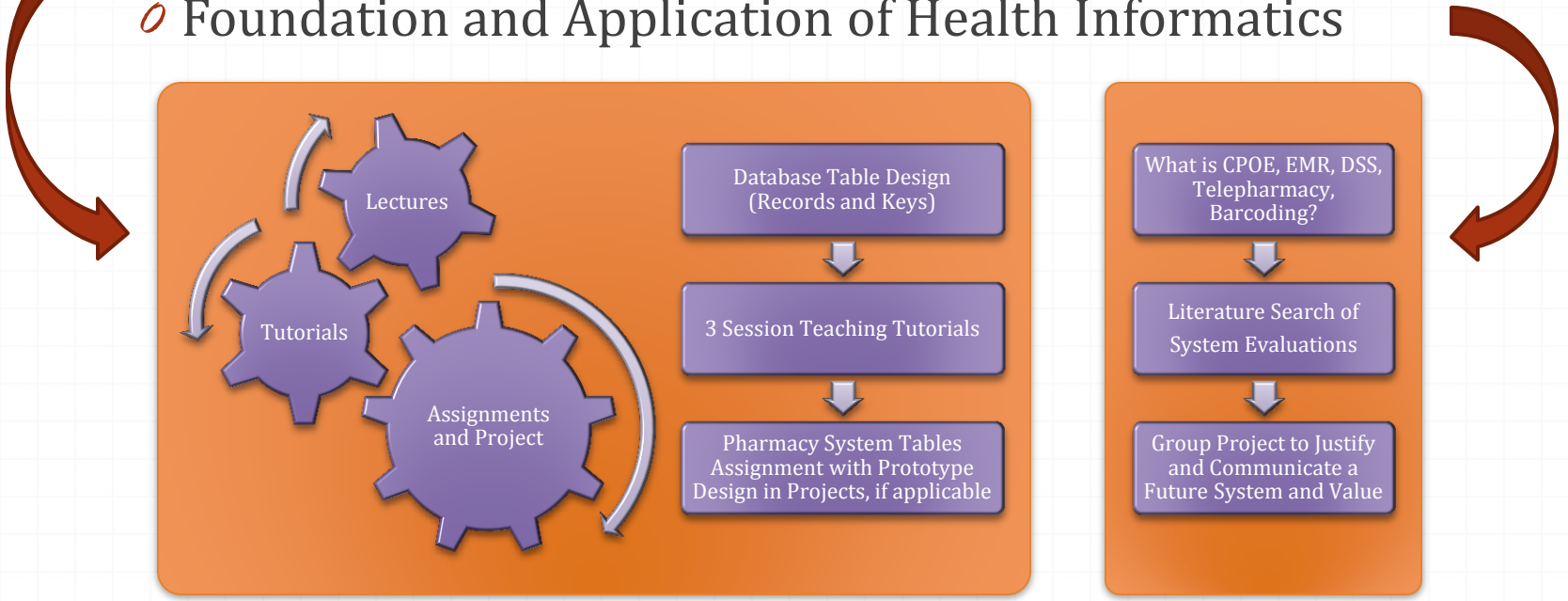




*http://www.ncbi.nlm.nih.gov/pubmed/19076675

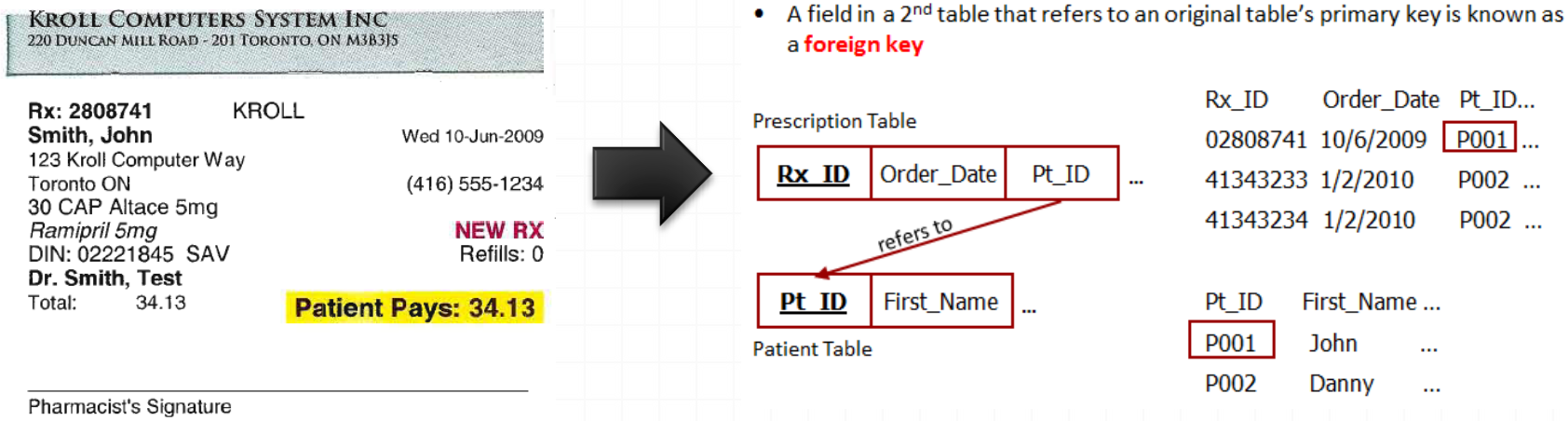
A Balancing Act
Keeping It Applicable And Relevant

- 1st Year and 2nd Year courses:
  - Computing for Pharmacists – Fundamental Concepts
  - Foundation and Application of Health Informatics



An Rx Label Example

- Understanding how data are stored in a database allows us to engage technologists with more confidence and insight, potentially leading to deeper collaborations in systems design or redesign



And Another…

Patient Table

Patient_ID (PK)	Last_Name	First_Name	Phone	Address	Doctor_ID (FK)
1	Smith	John	(416) 555-1234	123 Kroll Computer Way, Toronto, ON	1
2	Doe	Jane			2
3	Jones	Sam			3

Doctor Table

Doctor_ID (PK)	Last_Name	First_Name	Title	Address	Phone
1	Smith	Test	Dr	123 Doctor Way, Test, ON	(416) 555-1132
2	Jones	James	Dr	123 Doctor Way, Test, ON	(416) 555-1132
3	Jones	James	Dr	123 Doctor Way, Test, ON	(416) 555-1132

Prescriptions Table

Prescriptions_ID (PK)	Fill_Date	Fill_Time	Store_ID (FK)	Days	Sig	Doctor_ID (FK)	Patient_ID (FK)	DIN (FK)
2813741	[illegible]	[illegible]	223	30	Take 1 capsule a day	1	1	2221845

Medications Table

DIN (PK)	Product_Name	Strength	Unit	Generic_Name
2221845	30 CAP Altace 5mg	30	SAV	Ramipril 5mg

Allergies Table

Allergy_ID (PK)	allergy_name
1	peanuts
2	pollen

Patient_Alergies Table

Patient_Allergies_ID (PK)	Patient_ID (FK)	Allergy_ID (FK)
1	1	1
2	1	2
3	3	1

Group Projects

- A high collaboration effort in 5-member groups
  - 1st Year: Pharmacy system design and prototype, evaluated by peers
  - 2nd Year: Pharmacy system research, system proposal, and mock-up
- Encouraged to use freely available online collaboration tools such as Google Docs & Spreadsheet for project planning and Google Presentation for low fidelity system prototyping
- Students encounter challenges similar to real-life technology projects with multiple stakeholders, tight deadlines, and everything that entails

Course Topics

- Introduction to computing and networking
- Database theory and design
- Human Factors and Interface Design/Evaluation
- Hospital and retail pharmacy information systems
- Pharmacy automation
- Decision support systems
- Electronic medical records, EHR, CPOE, ePrescribing
- Telehealth and telepharmacy
- Inventory management and forecasting
- Analysis and reporting in Microsoft Excel

Course Design Notables

- Emphasis was on breadth of topics, to expose students to many relevant concepts
- A courseware package was created for 2nd year course that combined chapters from 3 pharmacy informatics texts
- Database query language "SQL" was originally taught using a dedicated School of Pharmacy server, to give fair access to all students. SQL was deemed too technical and eventually removed with sole focus on tables design only
- Pharmacists and informatics practitioners from private and public institutions were invited to give guest lectures
- Students had tutorial sessions devoted to "hands-on" operation of pharmacy information systems that they would likely encounter during work terms
- Social networking tools such as LinkedIn were introduced early to help students establish professional online presence, if desired

1st Year Project

- "The group project is a term-long project that applies the computing knowledge and technical skills learned in class to the design and evaluation of a **pharmacy related computing application**. Groups of students will **design and prototype** a pharmacy-related computing application as well as **evaluate other teams' designs** in order to "see both sides" of health applications development, that is, from designer and user points of view."

- "The project is unique in that a group's design mock-up shall be critiqued by two other groups using evaluation (human factors and usability) methods learned in the course. This approach offers students an engaging atmosphere in which to explore the design and use of healthcare information systems."

1st Year Project

- Topic Choices
  - Professional Allowance in Ontario
  - Bar-Coding and Dispensing Errors
  - Smart Inventory Management
  - Medications Management and Administration Errors
  - Patient Portal for Pharmacies
- Deliverables
  - Project proposal
  - Prototype report and files
  - Evaluation report (peer evaluation of 2 other projects)
  - Final report and 3 minute video presentation

2nd Year Project

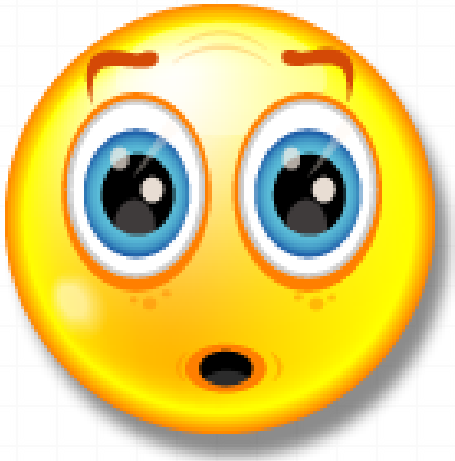
- "The Group Project takes a **research report** approach with opportunities for some very creative design to flex your Google Docs muscles! In summary, your group will research a **specific topic of health informatics** in much greater detail than in lecture to investigate its role in Canada's healthcare system, find news and research articles about its successes and challenges, and as a group, **create your own version of a system to address a pharmacy-related need**, and produce a small mock-up of data collection, analysis, or any combination of Google Documents to **convey and present your group's idea**."

2nd Year Project

- Topic Choices
  - CPOE
  - EMR & EHR (electronic medical records and health records)
  - ePrescribing
  - Barcoding
  - Medication Safety
  - Telehealth, Telemedicine, & Telepharmacy (i.e. remote care and consultation)
  - Decision Support Systems
  - Reporting and Data Mining

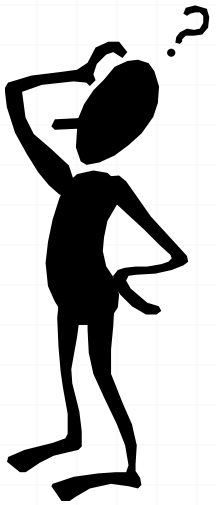
- Deliverables
  - Proposal
  - Final report
  - Communications brochure

Student Deliverable Examples



Not Without Challenges

- How do you relate technology to 110+ class size? Exceedingly difficult!!
- As a non-pharmacist, more practice context is always beneficial to students, so outreach to pharmacists is crucial. A pharmacist always puts them at ease
- A single authoritative teaching resource for Ontario/Canada pharmacy informatics is currently unavailable
- Students often prioritize core pharmacy courses above a “technology course”
- Achieving high relevance to pharmacy practice requires continuous curriculum and execution planning, and engagement with faculty
- Microsoft Access would be ideal and most accessible tool to teach database theory, but it is not included with student edition of MS Office
- A small number of students felt project workload was too high



Future Steps And Considerations

- At University of Waterloo School of Pharmacy, planning underway towards condensed, single course to be offered at 2nd year level
- There may be value in offering informatics seminar courses in upper years, for interested students with more developed technology and informatics experiences and skills
- Students should be encouraged to engage with technologists (e.g. developers, IT, vendors) on internal or external technology projects
- Students may be challenged to explore pharmacy technology and informatics related issues in independent study projects
- **My view: Pharmacy practice is ultimately advanced by pharmacy professionals! Technology and informatics are but among the many tools used on this journey**

Acknowledgements

- University of Waterloo School of Pharmacy for creating this opportunity for me

- Dr. Nancy Waite and Dr. Jake Thiessen for first contact
- Pharmacy students for their enthusiasm and support

- **Pharmacy technology educators and innovators!**

Questions?

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  - Or scan this QR Code!