Topics in Health Informatics

Instructor
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Email: All communication only via OWL

Time & Location
Lectures: Thursdays, 9:00 to 11:50am
Start date: January 11, 2024
Location: Middlesex College, Rm 320

Course Description
Evidence-based healthcare (EBHC) and data can play important roles in healthcare. EBHC's main purpose is to increase and improve the use of evidence (i.e., data and information) by stakeholders (e.g., health practitioners, policy-makers, public health managers, etc.). As health data continues to grow, big data is also playing an increasingly important role in different aspects of EBHC. The emergence of these two areas necessitates an examination of the role that health informatics (HI) can play in healthcare. HI tools and systems permeate healthcare at every turn—e.g., data and text mining tools for evidence generation, distillation, or synthesis; decision support for incorporating evidence-based protocols into clinical workflow; health data presentations to the general public; or web-based visualization tools for gaining insight into patterns of data. As HI tools advance, explicit understanding of, and investigation into, the relationship between HI and healthcare become increasingly vital. Furthermore, it is important to have an understanding of the concepts and principles that are involved in the design and evaluation of HI tools.

In this course, we examine a variety of topics related to health informatics—with particular emphasis on different areas of health informatics, HI tools and systems, big data in healthcare, artificial intelligence in health, analytics methods and their role in healthcare, health data presentation and tasks, and other emerging developments. It is important to note that this course *does not* deal with health management information systems. Specifically, the course is not about collection, storage, and evaluation of health-related data, nor does it cover any administrative aspects of health data.

This course is *cross-listed* (with students from different programs: Health Information Science, Computer Science, and Library and Information Science). You should feel comfortable being in a course that has students from diverse backgrounds, knowledge, skills, and viewpoints. Even though this is an introductory course and has no specific pre-requisites, this course has two requirements: 1) you should understand the concept of data (if not, familiarize yourself), and 2) you are expected to feel comfortable with interdisciplinary topics. This course sits at the intersection of information science, health, data science, computational technology, human-centred activity, and cognitive design.

Learning Objectives
- Developing a broad understanding of different terms, aspects, areas, and potential of health informatics
- Understanding the basics of health data, health data presentation, and analytics concepts
- Becoming familiar with big data and its role in health informatics
- Introducing some emerging research fields, technologies, and techniques in health informatics

Some Topics & Keywords
Health, medical, consumer, bio, public, population, nursing, and clinical informatics; evidence-based healthcare; health informatics tools and/or systems; descriptive, predictive, and prescriptive health analytics; big health data; health data mining; health data presentation; visual analytics; electronic health records; social media in health; conceptualization, design, and evaluation of health informatics tools; health information technology; human factors in and usability of health informatics technology; emerging trends in health informatics

Structure and Method of Evaluation
This is not a lecture-based course. A significant amount of class time will be spent discussing the listed topics above. You play a *central role* in class activities. You must study a number of selected papers (fewer than 30 papers/300 pages), examine them carefully, and engage intelligently in class discussions about the papers that you may like to watch. In addition, you will learn about health informatics by finding HI tools (or systems), analyzing them, and writings reports.

Grading Scheme
1. Paper summaries   **10%** (10x1%)
2. Research report   **15%**
3. HI tools slideshow   **15%**
4. Participation in class discussions   **30%**
5. Reflections report   **30%**

Paper Summaries (PS)

Since this is a topics course, we are not using a specific textbook. Rather, a number of articles have been selected that cover a wide range of ideas in health informatics. These articles are selected based on several criteria, the most important of which is to acquire a broad understanding of the above-mentioned topics without having any previous knowledge in health informatics. As such, some of these are not the latest published articles since that is not the most important reason for why they are selected for your study. Your Research Paper and HI Tool investigation are intended to do that. You will notice that as you go through the reading materials and are engaged in class discussions your depth of understanding and appreciation for the course topics increases. So, be patient with yourselves and the readings. Do not panic if you cannot understand everything at first. Since the readings are from different sources, no student in the course will be familiar with all the topics. *Most topics will be new to most people.*

The selected articles will be discussed during 10 weeks of the course, starting from the second week. You will study the readings for the week and prepare a 1-page summary. If you have multiple readings, this summary will be an integrated fusion of the concepts in those readings. Each summary is intended to serve a three-fold purpose: 1) to get you to think deeply about the gist of the articles and their main concepts (rather than their specific details), 2) to prepare you for the in-depth class discussions, and 3) to help with your reflections as the concepts evolve in the course. You will submit your 1-page summary through the OWL system. These summaries are <u>due by 12pm of the day before</u> class discussions. If a summary is not submitted on time, there will be no make-up opportunity for it, and that assignment will receive a mark of zero. You will not get these assignments back. The final mark for this assignment is based on the number of summaries that you submit--See the **Grading Scheme**.

Research Paper (RP)

One of the goals of this course is for you to conduct independent research. Each of you will select a topic and write a <u>1000-word (max. 1100-word) paper</u> (excluding references) about it. The paper you write is about *a recent development in health informatics* that you find interesting. Your paper should include a minimum of 8 references (excluding the assigned readings for the course) from reputable conference and journal sources (cannot be web sites and blogs). You should include your word count on the cover sheet of the paper. In addition, on the refence page of the paper, on the left-hand side of every reference, you should put a number that shows how many times that reference is used in your paper.

Breakdown of the research paper marks (adds up to 15%):
1. Content:
   a. Breadth of reported research: 1%
   b. Depth of reported research: 1%
   c. Relating the report to the themes and concepts studied in the course: 3%
   d. Novelty and newness of the chosen topic: 2%
   e. Logical connection of concepts and flow of ideas throughout the report: 1%
2. References:
   a. First 8 references: 1%
   b. Extra references beyond the first 8: 0.5%
   c. Proper usage and distribution of all references in the text: 1.5%
   d. Relevance of references to the main theme of the report: 1%
   e. Proper APA formatting (see http://guides.libraries.psu.edu/apaquickguide/intext): 1%
3. Form:
   a. Quality of writing, grammar, and punctuation: 1%
   b. Organization (including division of concepts, headings, sub-headings, etc.): 1%

HI Tool Slideshow (TS)

You will investigate, find, and select an HI tool/system. There are many systems out there. You will analyze the system *in terms of the concepts that you have studied in the course*. Selection of appropriate tools is crucial in this assignment. In this course, we are <u>not interested</u> in healthcare management tools, database tools, or tools that allow you to construct other tools (e.g., Tableau)—do not select such tools for this assignment. The selected tool must enable stakeholders to perform health-related, information-driven activities. Prepare a PowerPoint slideshow of the

selected HI tool with images, embedded videos, and overlay audio. Keep in mind that the main purpose of this assignment is for you to do research and get exposed to HI tools.

Breakdown of the HI tool assignment marks (adds up to 15%):
1. Functionality & purpose:
    a. Demonstration of functionality (embedded videos and screen shots): 3%
    b. Complexity of the tool: 2%
    c. Novelty of functionality of the tool: 1%
    d. Novelty of purpose of the tool: 1%
2. Analysis:
    a. Analysis of the tool in terms of the main topics of the course: 4%
    b. Discussion of shortcomings of the tool: 1%
    c. Discussion of how you would improve the tool: 1%
3. Form:
    a. Quality of PowerPoint slides: 1%
    b. Coherence of presentation: 1%

Participation in Class Discussions & Attendance
You will study a number of papers (e.g., journal articles, book chapters, and conference papers) dealing with health and medical informatics, big data, analytics, and other related topics. Each of you is responsible to study all the selected papers. These papers will be discussed in class. The instructor or you can raise questions from these materials. Having carefully examined and identified the *main concepts and ideas* of these papers on your own, you are to participate regularly in class discussions: expressing your ever-growing understanding of the concepts and ideas intelligently, answering questions, analyzing and evaluating other expressed opinions and ideas, asking deep questions based on a thorough reading of the papers, and so on. To make it easier to participate in class discussions, *all students must make sure to wear name tags*.

You are to attend all classes and *be in class at least 5 minutes before the start of the class*. Late arrival results in deduction of participation marks. Legitimate absence from classes is allowed, but you need to inform the instructor in advance.

To facilitate class discussions, students are encouraged to wear name tags.

Rough breakdown of Participation mark (adds up to 30%):
- Regular and timely attendance in classes   10%
- Regular engagement and participation in class discussions   8%
- Identification and careful examination of the *main concepts and ideas* in papers   12%

Reflections Report (RR)
In this assignment, you write your reflections (both analysis and synthesis) about all the papers and discussions in the course: your initial conception of ideas, what you learned as we went through the different topics and discussions, how your understanding evolved through the course, how you think HI impacts healthcare, what the future holds, challenges ahead, and the like. This will be a <u>2400-word (max. 2500-word) report</u>. You should include your word count on the cover sheet of the report. It may help if you keep a running diary during the course.

Breakdown of the research report marks (adds up to 30%):
1. Content:
    a. Analysis of the studied papers and concepts: 7%
    b. Synthesis and relationship of all concepts: 10%
    c. Reflections about past, future, trends, speculations, etc: 4%
    d. Logical flow and connectedness of ideas throughout the report: 4%
2. References:
    a. Proper APA formatting: 1%
       (see http://guides.libraries.psu.edu/apaquickguide/intext)
3. Form:
    a. Quality of writing, grammar, and punctuation: 2%
    b. Organization   2%
       (including division of concepts, headings, sub-headings, etc.)

Written Materials and Deliverables
All written reports (for all assignments) should include a *cover sheet*: title of the report (e.g., Research Report), title, course number, date, and name of each student (make sure not to put your IDs on the cover sheet). Pages should be

numbered. Furthermore, all written work should be in the Times New Roman font, font size 14, be double-spaced, and have wide margins for digital comments. All your assignments should be submitted electronically as PDF and PowerPoint files. All submissions will be through the OWL system (https://owl.uwo.ca/), under your Drop Box tab. All file submissions will have the following naming format, with the code of the assignment at the beginning: AssignmentCode_FamilyName_FirstName. For example, if one's name is Joe Smith, the following naming schemes must be used: RP_Smith_Joe.pdf, PVS1_Smith_Joe.pdf, PVS2_Smith_Joe.pdf, TS_Smith_Joe.pptx, or RR_Smith_Joe.pdf.

Communication

All course-related emails should come through the OWL system. No emails from other accounts will be read or accepted. Also, any email you send should have a proper subject line (e.g., RP question). If you do send me an email, I generally answer within 5 days, depending on the volume of emails I have received during that week. However, I always try my best to reply to your emails as soon as I can. Please do not expect replies to emails during weekends or after 6pm.

Course Schedule and due dates (Tentative)

Week	Date	Assignments & Activities
#1	1-11	Introduction and setting goals
#2	1-18	PS #1
#3	1-25	PS #2
#4	2-1	PS #3
#5	2-8	PS #4
#6	2-15	PS #5 **Due**: RP
#7	2-22	**Reading Week**
#8	2-29	PS #6
#9	3-7	PS #7
#10	3-14	PS #8 **Due**: TS
#11	3-21	PS #9
#12	3-28	PS #10
#13	4-4	Wrap-up, open discussion **Due**: RR

Plagiarism

Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Discipline for Graduate Students at http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf)

Research papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (http://www.turnitin.com).

Accessibility

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

Support Services

Students who are in emotional/mental distress should refer to Mental Health@Western http://www.uwo.ca/uwocom/mentalhealth/ for a complete list of options about how to obtain help.