Course Overview:

Consumer health informatics (CHI) is a rapidly expanding area of informatics practice, with career opportunities emerging in the public, non-profit, and private sectors. Broadly, the field aims to give individual health care consumers, as well as their families and communities, the information and tools that they need to help them become more involved in their health and health care. In this course, students will become familiar with a range of CHI applications, including the needs/problems that the applications address, their theoretical bases, their design, and relevant evaluation results.

The course will cover an overview of health behavior theories that are relevant to health behavior change and health information behavior and explore how they might be applied to promote changes in health behavior and/or explain health consumers’ behaviors. The course will also introduce key issues such as health literacy, patient-centered communication, patient empowerment, patient-generated data, participation, and privacy. Students will acquire an ability to evaluate existing applications, and to generate theory-informed design and implementation strategies for CHI applications. Students will also learn to assess the needs and technological practices of potential users, with a particular focus on groups that experience health and information access disparities.

Learning Objectives:

By the end of the class, students should be able to:
1. Explain what consumer health informatics is, and describe how theory can be used to facilitate changes in health behavior and/or promote health.
2. Compare and evaluate a range of consumer health informatics (CHI) applications.
3. Assess consumers’ health-related needs, resources, and technology-oriented practices, and evaluate their implications for CHI applications.
4. Develop guidelines and recommendations for addressing identified needs using consumer technologies.
5. Develop a commitment to CHI practice with diverse user groups.

HBEHED Competencies:

This course provides training towards the following HBEHED competencies:
1. Understand the merits of using theory to inform interventions and their evaluation in public health.
2. Apply evidence-based approaches to the development and evaluation of public health programs.
3. Design, implement, and evaluate culturally appropriate interventions for diverse individuals and communities.
Course Resources:

There are assigned readings drawn from a range of sources. Course readings and other resources are delivered via the University of Michigan Canvas course management system (or the World Wide Web). The Files folder in Canvas contains copies of the weekly course reading, located in subfolders labeled by week number.

Separate Canvas folders include tools for submitting assignments and other facilities. The most current copy of this document, the Course Syllabus, also resides on the Canvas site.

All course materials are provided in electronic form under the “fair-use” copyright exemption. This means that you may not redistribute copies of class reading outside the class. For more information, see “Copyright at the University of Michigan: For Students.”

Course Expectations:

This is an interactive, virtual course, which includes break-out and larger group discussions. Video cameras MUST be turned on during the interactive discussion segments. I hope that the class will be an opportunity for all of us to learn more about consumer health informatics. Your active participation will enrich your own and that of your classmates’ exploration of CHI-related topics.

Your attendance and participation are critical to your success in this class. Please read the background readings that have been assigned before each class session and be ready to discuss them. Please also consider the proposed questions on the syllabus in advance of each class meeting and consider how you might be able to apply the material to your interests/work.

OVERVIEW OF ASSIGNMENTS

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Class No.</th>
<th>Date</th>
<th>Value (% of Final Grade)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHI Application Critique (Individual Assignment)</td>
<td>Class 4</td>
<td>Feb. 15</td>
<td>20%</td>
</tr>
<tr>
<td>Designing for Diversity Project (Group Assignment)</td>
<td>Class 8</td>
<td>Mar. 15</td>
<td>20%</td>
</tr>
<tr>
<td>Needs Assessment &amp; Gap Analysis (Group Assignment – Part 1)</td>
<td>Class 11</td>
<td>Apr. 5</td>
<td>25%</td>
</tr>
<tr>
<td>Lightning Talk: New CHI Intervention/App (Group Assignment – Part 2a)</td>
<td>Class 13</td>
<td>Apr. 9</td>
<td>5%</td>
</tr>
<tr>
<td>Proposal: New CHI Intervention/App (Group Assignment – Part 2b)</td>
<td>Week of Class 13</td>
<td>Apr. 21</td>
<td>20%</td>
</tr>
</tbody>
</table>

There is an additional 10% of your grade that is calculated based on class attendance and participation during case study discussion sessions and discussion forum posts. A minimum of 3 discussion forum posts are required over the course of the semester.

Assignment Format:

Assignments should be written in a 12-point font on letter-sized paper with one-inch margins. All papers should be double-spaced – with the exception of the “Design Principles” document developed for the Designing for Diversity assignment. You can use the fonts and spacing that you wish for that assignment. If citations are included, please use American Psychological Association (APA) style guidelines for citing materials used in your assignments. The style guide can be found online at http://owl.english.purdue.edu/owl/resource/560/01/.
Please submit your assignments in Microsoft Word format. Please name your Word file beginning with your surname. For group assignments, please use surname(s) in alphabetical order, followed by the assignment title (e.g., Williams_CHI_Application_Critique.docx).

**Late Assignments:**

Assignments that are submitted late will lose 2/3 of a letter grade on the first day that an assignment is late. After that, 1/3 of a letter grade will be deducted for each day the assignment is late, up to two whole letter grades. Students may request an extension, but they must contact me 24 hours in advance and give a valid reason why they are late.

**Grade Reconsideration:**

I make every effort to apply grading criteria objectively and fairly. However, if you believe the grade you received on an assignment is inappropriate, you may ask to have your grade reconsidered. To do so, you must explain in an email to your instructor why you feel your work deserves re-grading. You should provide details and point to specifics in the assignment that you feel merit a higher grade. Requesting a grade reconsideration does not ensure that your grade will change, but your arguments will be carefully considered. Note: one of three outcomes is possible: your grade may be raised, it may remain the same, or it may be lowered.

**Grading:**

**Drawing from the Master’s Student Handbook, all assignments will be graded as follows:**

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Points</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>98-100</td>
<td>Extraordinary achievement. Rarely given.</td>
</tr>
<tr>
<td>A</td>
<td>94-97</td>
<td>Outstanding performance in all course aspects; such qualities as analytical ability, creativity, and originality are exhibited at a very high level.</td>
</tr>
<tr>
<td>A-</td>
<td>90-93</td>
<td>Consistently good performance in most course aspects.</td>
</tr>
<tr>
<td>B+</td>
<td>86-89</td>
<td>Strong, solid achievement in most aspects of the work.</td>
</tr>
<tr>
<td>B</td>
<td>83-85</td>
<td>Good performance. Consistent with performance expected of students in a graduate degree program.</td>
</tr>
<tr>
<td>B-</td>
<td>80-82</td>
<td>Acceptable.</td>
</tr>
<tr>
<td>C+</td>
<td>76-79</td>
<td>Borderline.</td>
</tr>
<tr>
<td>C</td>
<td>73-75</td>
<td>Poor performance. This is a marginal grade which alerts students to their limited performance in a particular course.</td>
</tr>
<tr>
<td>C-</td>
<td>70-72</td>
<td>Very poor performance.</td>
</tr>
<tr>
<td>D</td>
<td>69 and below</td>
<td>Minimal. Performance not at a graduate student level. Student should review their progress in the program with the associate dean for academic affairs.</td>
</tr>
</tbody>
</table>

**Attendance and Participation:**

Given the case discussion heavy nature of the course, every student is required to attend class. Because life has eventualities, you are allowed one unexcused absence, and one excused absence. Any absence outside of these two allowances will result in 1% point being deducted for each instance from your participation grade.

**COURSE POLICIES**

**Academic Integrity:**

Unless otherwise specified in an assignment all submitted work must be your own, original work. Any excerpts, statements, or phrases from the work of others must be clearly identified as a quotation, and a proper citation provided.
Any violation of the School’s policy on Academic and Professional Integrity (stated in the Master’s and Doctoral Student Handbooks) will result in serious penalties, which might range from failing an assignment, to failing the course, to being expelled from the program. Violations of academic and professional integrity will be reported to UMSI Student Affairs. Consequences impacting assignment or course grades are determined by the faculty instructor; additional sanctions may be imposed by the Assistant Dean for Academic and Student Affairs.

**Accommodation for Students with Disabilities:**

If you think you need an accommodation for a disability, please let me know at your earliest convenience. Some aspects of this course, the assignments, the in-class activities, and the way we teach may be modified to facilitate your participation and progress. As soon as you make me aware of your needs, we can work with the Office of Services for Students with Disabilities (SSD) to help us determine appropriate accommodations. SSD (734-763-3000; ssd.umich.edu) typically recommends accommodations through a Verified Individualized Services and Accommodations (VISA) form. I will treat any information that you provide in as confidential a manner as possible.

**Student Mental Health and Wellbeing:**

The University of Michigan is committed to advancing the mental health and wellbeing of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, contact Counseling and Psychological Services (CAPS) at (734) 764-8312 and caps.umich.edu/ during and after hours, on weekends and holidays, or through its counselors physically located in schools on both North and Central Campus. You may also consult University Health Service (UHS) at (734) 764-8320 and uhs.umich.edu/mentalhealthsvcs/, or for alcohol or drug concerns, see uhs.umich.edu/aodresources/. For a listing of other mental health resources available on and off campus, visit: caps.umich.edu/article/um-mental-health-resources/.

**Definition of Consumer Health Informatics used in this course:**

“All electronic tool, technology or system that is:

1. primarily designed to interact with health information users or consumers (anyone who seeks or uses healthcare information for nonprofessional work),
2. interacts directly with the consumer who provides personal health information to the CHI system and receives personalized health information from the tool, application or system, and
3. is one in which the data, information, recommendations, or other benefits the consumer, may be used in coordination with a healthcare professional but is not dependent on a healthcare professional.” (Gibbons et al, 2011)

All technologies evaluated or proposed as a part of assignments in the course should conform to this definition.

**Acknowledgements:**

Thank you to Johmarx Patton, MD, MHI for his assistance in preparing this syllabus.
# Course Schedule

## Introduction and Background

<table>
<thead>
<tr>
<th>January 25</th>
<th>What is Consumer Health Informatics and what impacts have CHI applications had, and for whom?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td></td>
</tr>
</tbody>
</table>

### Background Readings


### Optional


### Case Study


### Discussion Questions

- What impacts have CHI applications had, and for whom?
- What impacts are missing? Who is missing?
- What needs are not met, and what can we do about it?

## Theories of Health Behavior and Change

<table>
<thead>
<tr>
<th>February 1</th>
<th>Part 1: Theory of Planned Behavior / Integrated Behavioral Model</th>
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<tbody>
<tr>
<td>Class 2</td>
<td></td>
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</tbody>
</table>

### Background Readings


### Case Studies

*Get Active!*

Program: Randomized Controlled Trial. Journal of Medical Internet Research, 9(2), e7, URL: http://www.jmir.org/2007/2/e7/. (since commercialized as “Imperative Health”)

• Imperative Health application [Slide deck]

**Computerized simulation in promoting walking in individuals with diabetes**

• To see the Simulation, see Multimedia Appendix 1 and Multimedia Appendix 2.

**Discussion Questions**

• What TRA/TPB/IBM-related behavior change techniques are used in each of the two case study systems?
• Are any behavior change techniques shared between the two systems? Which behavior change techniques are not shared?
• How are any shared behavior change techniques implemented in each system?

**Theories of Health Behavior and Change**

| February 8 |
| Class 3 |
| Part 2: Socio-cognitive Theory |

**Readings**


**Case Studies**

*Watch, Discover, Think, and Act*

• Watch, Discover, Think, Act Screens [Slide deck]

*Text2Quit*

• Text2Quit application: http://www.text2quit.com

**Discussion Questions**

• What SCT-related behavior change techniques are used in each of the two case study systems?
• Are any behavior change techniques shared between the two systems? Which behavior change techniques are not shared?
• How are any shared behavior change techniques implemented in each system?
Theories of Health Behavior and Change

February 15  
Class 4

ASSIGNMENT 1 DUE – CHI Application Critique
Guest Speaker: Parisa Soraya, MHI – Manager, Solutions Delivery, ArborMetrix

Readings


Case Study

Kaiser Permanente


Discussion Questions

• What does the Kaiser Permanente case study suggest about the ways in which user requirements for feedback can vary? Given this, what decisions do we need to make when designing feedback as an intervention component in a CHI application?
• What does the case study tell us about the design of goals for user engagement?

Games for Health and Self-monitoring

February 22  
Class 5

Gamification and its role in Consumer Health Informatics

Readings


Case Studies

MoviPill

Youth-focused pervasive social health games


MONARCA


Discussion Questions

• How can one apply gamification principles to the design of consumer health informatics applications?
• How was this accomplished in the MoviPill and youth-focused social games case studies?
• For consumers and patients, what are the effects of self-monitoring?

Designing for Diverse Populations

<table>
<thead>
<tr>
<th>March 1 Class 6</th>
<th>Inclusive Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guest Speaker: Ezinne Ndukwe, MPH - Population Health Director, Oak Street Health</td>
<td></td>
</tr>
</tbody>
</table>

Readings


Case Studies

mHealth


Dietary Intake Monitoring Application (DIMA)


Discussion Questions

• Which population do you think would have similar design principles and in what way are they similar?
• What aspects of design of CHI applications vary depending on the audience?
• Compare mHealth and DIMA. In the DIMA case, what did the designers do to address the fact that their intended users had low literacy? How might those decisions have been different if literacy were not a concern?
### Designing for Diverse Populations

| March 8  | Class 7          | Personas and Usability |

### Readings


### Discussion Question

- What are personas and how are they used in the design of technologies?

### In-class Activity

- Developing personas

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### Designing for Diverse Populations

| March 15 | Class 8          | Designing for Diversity Group Presentations |

**ASSIGNMENT 2 DUE – Designing for Diversity**

### Questions to consider during presentations

- Which populations have similar design principles? Why are they similar?
- What aspects of design of CHI applications varied depending on the audience?

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### Awareness and Feedback

| March 22 | Class 9          | Personal Health Records and Consumer Ethics; Privacy and Confidentiality |

**Guest Speaker: Tawny Czilok, MHI, BSN, RN – Assistant Program Manager, Michigan Hospital Medicine Safety Consortium**

### Readings

Case Study

*Apple HealthKit and Health App*


Discussion Question

- Evaluate Apple Health for comprehensiveness of coverage, connectivity to clinical systems, usability, ability to support patients’ self-management activities, and privacy/security.

Awareness and Feedback

<table>
<thead>
<tr>
<th>March 29</th>
<th>Remote Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 10</td>
<td><strong>Guest Speaker: Nithya Rajendran, MHI – Senior Research Analyst – Health Sciences, National Opinion Research Center (NORC), University of Chicago</strong></td>
</tr>
</tbody>
</table>

Readings


Case Studies

*Home-based telemonitoring*

- Scherr, et. al. (2009). Effect of home-based telemonitoring using mobile phone technology on the outcome of heart failure patients after an episode of acute decompensation: Randomized controlled trial. Journal of Medical Internet Research, 11(3), e34. doi:10.2196/jmir.1252

*EPIMEDICS Telemedicine Project*


Discussion Questions

- What was being measured in the two case studies from this week’s readings?
- What was patient adherence and experience like, and why?
- What decision rules were used to identify a need for clinician action?
- When were alarms sent, to whom were they sent, and what messages were provided?
ASSIGNMENT 3 DUE – Needs Assessment and Gap Analysis

Guest Speaker: Ryan Freeland, MHI – Customer Experience Design Strategist, Premera Blue Cross

Readings


Case Study

PatientsLikeMe
• Frost, J. H., & Massagli, M. P. (2008). Social uses of personal health information within PatientsLikeMe, an online patient community: what can happen when patients have access to one another’s data. Journal of Medical Internet Research, 10(3). URL: http://www.jmir.org/2008/3/e15/
• Application: http://www.patientslikeme.com/

Discussion Questions

• How might peer-to-peer communication between patients benefit them? What potentially negative effects might there be, if any?
• What does PatientsLikeMe do to encourage commitment amongst its members?
• What does PatientsLikeMe do to encourage contributions by its members?

Readings


Case Study

HealthWeaver
• Pratt, Wanda. Video lecture on HealthWeaver: http://vimeo.com/20480876

Discussion Questions

• What specific features did the creators of HealthWeaver include in their system so as to increase the amount of social support that cancer patients receive (“enacted support”)? How might those features help to increase enacted social support?
• Do you think any of the features of the system might help to increase perceptions of available support? If so, what are they and how do they work?
• How can designers of social networking technologies make it easier for patients to understand what information they are sharing, and with whom?

The Future of Consumer Health Informatics

| April 19 | ASSIGNMENT 4 DUE – Lightning Talk |
| Class 13 |

Informational Readings


NOTE: Assignment 5 DUE on Wednesday, April 21 at 5:00 P.M EDT – CHI Proposal