Main Syllabus

Designing effective interactive systems requires understanding the needs and capabilities of the people who will be using them. We will examine human capabilities and behavior as they relate to the design of interactive information systems. We will survey contemporary theories and findings from the social sciences (especially psychology), with special attention to how these are applied in human-computer interaction, as we explore the links between behavioral science and system design.

Instructors and Communication Information

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Office Hours: Wed 9:30-10:30 (N Quad) ; Fri 9:30-10:30 (SI North)  
Note: It's a good idea to let me know in advance if you're planning to come to office hours. I've been known to cannibalize my office hours if I'm not expecting anyone to show up (which is the norm, in my experience). If you can't make the posted time but would like to speak with me, you may contact me for an appointment.

To email the entire class, use: si688f10@ctools.umich.edu

Learning Goals

After taking this class, students will be able to:

- Identify key features of human behavior and describe their impact on the design of interactive systems.
- Critique and design interactive systems on the basis of knowledge of human capabilities and behavior.
- Describe themes from the research literature in social science and human-computer interaction as they relate to interactive system design.

Class Meetings

The class meets on Thursday afternoons 1-4pm. The first class meeting will be on Thursday, Sept 9 and the final meeting will be on Dec 20. Each class meeting will consist of roughly 1/2 lecture & discussion, and 1/2 in-class exercise. You are expected to have done the required readings in advance and to be prepared to discuss them.

Assignments and Grading

There will be three assignments in this class and one term paper. The assignments will consist of one or two interactive systems based on your personal experiences with those systems and the principles covered in this course. All assignments will be submitted individually. In addition, there will be graded in-class group assignments every week. These group assignments will be posted to the CTools Forum where they can be commented upon by other students. As part of your class participation grade, you are expected to comment on at least one other group's assignment every week.

- Assignment 1: 20% (released 9/30, 4:30pm; due 10/7, noon)
- Assignment 2: 20% (released 10/28, 4:30pm; due 11/4, noon)
- Assignment 3: 20% (released 12/2, 4:30pm; due 12/9, noon)
- Term Paper: Reflections on personal experiences with interactive systems: 20% (due 11/18)
- Participation: in-class assignments, class discussion, and online discussion posts: 20%
Things come up. I understand that not everyone will be able to make it to class every week and there may be reasons why an assignment needs to be turned in late. Here are some policies regarding absence and lateness:

**In-class Assignments**
- You must be present in class for the entirety of the in-class group work time to receive credit for that week's in-class assignment.
- You can miss up to two in-class assignments and up to two comments with no penalty. If more than two absences are required for legitimate reasons*, you must notify the instructors by email.

**Homework Assignments**
- All assignments are due at 12:00 (noon) on the date listed for that assignment.
- Any assignment submitted after 12:15 pm (as indicated by the CTools timestamp) will be assessed a 10% penalty.
- Each additional 24 hours of lateness will result in an additional 10% being taken off the grade.
  - Before the deadline: No penalty
  - 0:16-24:00 hours after the deadline: 10% off
  - 24:01-48:00 hours after the deadline: 20% off
  - etc., until 120:01 hours after the deadline: No credit
- If an extension is required for legitimate reasons*, you must make your request to the instructors by email.

* "Legitimate reasons" for absence and lateness include illness, family emergencies, job duties, extracurricular work—you are required to plan ahead to meet your deadlines in all classes.

**Collaboration and Original Work**

**Collaboration**
I strongly encourage collaboration while discussing and interpreting the readings. Active learning is effective. However, you may not discuss the answers to the questions with any other members of the class. If you have clarification questions, please direct them to the instructor.

Your ideas for your term paper can be discussed with other members of the class, however direct collaboration is not allowed. All substantive writing and analysis must all be your own, though you may use ideas that emerged from group discussions. Any such ideas that you used should be acknowledged in your final report and credited to the individual(s) who helped you come up with them.

**Plagiarism**
All written submissions must be your own, original work. Original work for narrative questions is not mere paraphrasing but must be clearly marked as quotations. You may incorporate selected excerpts from publications by other authors, but they must be clearly marked as quotations. To spell it out:
- Before the deadline: No penalty
- 0:16-24:00 hours after the deadline: 10% off
- 24:01-48:00 hours after the deadline: 20% off
- etc., until 120:01 hours after the deadline: No credit

In this course, an assignment containing plagiarised material will receive a grade of zero (0%). If you are unsure about whether a passage in your writing constitutes plagiarism, you are encouraged to seek help from myself or from the Sweetland Writing Center. Be sure to plan sufficiently ahead in your writing.

**Accommodations 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 class participation, such as on-campus attendance and in-class activities, 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; Individualized Services and Accommodations (VISA) form. I will treat any information you provide as private and confidential.

**Readings**
There are no required texts for SI 688 this semester. We will be drawing readings from a number of texts, as well as links to papers that you can access. Several of the readings are hosted on servers (e.g., the ACM Digital Library) that require authentication through your University of Michigan login. Note that there may be changes to the reading assignments as the semester progresses. I will notify the class by email and/or CTools Announcement.
During the introductory week, we will talk about the motivation for understanding the user and how Computer Interaction has considered human behavior across time.

Readings

For this week, you aren't expected to do the readings in advance. You should go back and read

- Ritter, F. E., Churchill, E., and Baxter, G. D. (2010) Chapter 1: Why and When Do We Need to Know Right Now? This chapter provides an interesting and fairly thorough overview of the intellectual background on humans (the ABCS) as well as evaluation methods and design processes.
- Ritter, F. E., Churchill, E., and Baxter, G. D. (2010) Chapter 2: The History and Components of Human Computer Interaction. This classic paper from CHI '90 provides a framework for systematically analyzing input devices in terms of the interaction channel and how they provide to users. As new interaction devices come into being (consider, for example, the sudden explosion of multitouch technology), it is important to understand what types of actions are possible with these devices and that information can be presented effectively.

In HCI research, knowledge about human sensory-motor capabilities plays a large role in studies of information presentation and information visualization. In this long and somewhat sprawling chapter, we will primarily focus on the material about the visual system (sections 4.1 and 4.2) since the visual system is the primary channel for communicating information in interactive systems. Other senses are important for a broad understanding of human capabilities but play a fairly minor role in most interactive computing situations. Section 4.3 on touch is interesting as well, though the issues it raises are only relevant to a fairly specialized subset of user interactions. Section 4.2 is relevant to the domain of ergonomics but not particularly relevant to this class. The concept of "affordances" mentioned in the intro (4.1) will come up again in Week 5.

Further Reading: Examples of Relevant HCI Research

- Card, S. K., Mackinlay, J. D., and Robertson, G. G. 1990. The design space of input devices. In Guiard's model and bimanual control are mainly of relevance to researchers at this point and will not be discussed in class.
- Karlson, A. K. and Bederson, B. B. 2007. ThumbSpace: generalized one-handed input for handheld devices. This paper provides a good overview of the breadth of human capabilities but play a fairly minor role in most of these are presented too superficially to be of much use at this point---skim them.
- Grossman, T. and Balakrishnan, R. 2005. The bubble cursor: enhancing target acquisition. This chapter provides an interesting and fairly thorough overview of the intellectual background on humans (the ABCS) as well as evaluation methods and design processes.
- Suh, B., Woodruff, A., Rosenholtz, R., and Glass, A. 2002. Popout prism: adding percepts to computer vision interfaces. This classic paper from CHI '90 provides a framework for systematically analyzing input devices in terms of the interaction channel and how they provide to users. As new interaction devices come into being (consider, for example, the sudden explosion of multitouch technology).
Week 3: Sensing, Attention and Memory

Readings

  - The first part of this chapter introduces the Information Processing model of human cognition. Understanding this model is crucial for grasping the concepts of attention and memory. Also, the concept of working memory is helpful for understanding how attention works.

  - These two chapters from Wickens’ more “applied” textbook are somewhat dense but give an excellent review of the dominant theories of attention and time-sharing. They are particularly relevant to understanding the characteristics and limitations of human memory.

Week 4: Memory, Learning, and Skill

Memory and learning play a crucial role in nearly every interaction that people have with computers. Every time someone uses a new web site, a new function, a new device... there is learning involved. When the learning is about figuring out a new process, we call it “acquiring a skill.” Learning is helped or hindered by a number of factors, including the user’s knowledge and skill, and whether the system demands performance from the users’ memory in ways that are known to be effective or not.

This week, we’ll talk about the basics of memory and learning and explore how to apply that knowledge to design.

Readings

  - From this reading, we’ll talk more about working memory (which you read last week but was only briefly discussed during the lecture). Wickens moves on to long-term memory. The basic outline given by Wickens is picked up by Norman, who goes into more detail.
  - After page 143, Wickens moves on to a host of other topics that, while interesting of course, are not relevant to this week. Read on if you’d like, but you don’t have to.

  - Norman gives a pretty thorough overview of memory and links memory nicely to understanding the characteristics and limitations of human memory. He also discusses the various findings about what people find easy and hard to remember, the sections on transfer and interference (along with the discussion of schemas and scripts), are especially worth paying attention to.

Week 5: Mental Representations and Problem Solving (Decision Making)

Readings: TBD

Week 6: Individual Differences

Readings: TBD

Week 7: Applications / Summary of the Cognitive Approach?

Readings: TBD

Week 8: Language and Communication

Readings: TBD

Week 9: Emotion and Motivation

Readings: TBD


Readings: TBD

Week 11: Social Interaction and the Complexity of the Real World

Readings: TBD

Week 12: Returning to the Body: Phenomenology and Embodied Interaction

Readings: TBD

Week 13: Wrap-Up

Readings: TBD