

IMT 540: HCI DESIGN FOUNDATIONS FOR INTERACTIVE SYSTEMS

Autumn 2009
Masters of Science in Information Management
Information School
University of Washington

Introduction to the theory and practice of user-centered design. Examines design methods for identifying and describing user needs, specifying and prototyping new systems, and evaluating the usability of systems. Examines design methodologies such as contextual design and value-sensitive design, giving specific emphasis to human-information interaction.

Prerequisite: permission of instructor

Course website, listserv & Meeting space

<http://courses.washington.edu/imt54006/>

Find the syllabus, assignments, readings, and other key information here

imt540b_au09@u.washington.edu

Registered students are subscribed automatically using their UW mail account.

<http://uweoconnect.extn.washington.edu/davidhendry/>

Adobe Connect meeting space – used for synchronous, remote class engagements

Credit Hours

4 (4 lecture/studio hours; 8 outside hours)

Meeting times

Lecture/studio: Friday 4:30 – 8:20 – MGH 234

Instructor

David Hendry, Assistant Professor
330P Mary Gates Hall
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<http://faculty.washington.edu/dhendry>

Office hours: Friday 3 – 4 pm or by appointment.

Student services

Kathy Wong, Academic Advisor
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Overview

Design is a unique form of inquiry. We design whenever we change some existing situation into a preferred one. The difficulty, of course, is how to envision a preferred situation and then get to it. In this class we will develop an appreciation for the nature of design and we will develop specific skills for studying and creating interactive systems. You will find the concepts and methods covered in this class to be widely applicable – you will be able to use them when designing organizations of people, when designing information structures, and when designing a business plan. But, in this class we shall focus on the design of interactive systems, on human-centeredness and on usability. The major question is how do we design interactive systems that are useful, usable, and enjoyable?

Textbooks and Readings

Please purchase the following two books:

Norman, D.A. (2002). *The Design of Everyday Things*. New York: Basic Books. [ISBN-13: 978-0465067107]

This is a classic in the field of human-computer interaction and usability. An easy read and full of insights for thinking about interactive computing and systems. It was originally published as *The Psychology of Everyday Things*.

Tufte, E. R. (2006). *Beautiful Evidence*. Graphics Press. [ISBN-13: 978-0961392178]

A brilliant book on the design of presentations, meant to describe, clarify, explain, and persuade. The fourth in a series of classic books on visual design.

Beginning week #4, we shall draw upon the material in these books during each of our weekly meetings.

In addition, each week we shall read 2–4 papers that engage the topic for the week. You will find the readings below, week-by-week. You should read each paper carefully and to come to class with an in-depth understanding of the authors' views.

During class we will critically discuss the papers and examine their implications for the design of interactive systems. We shall strike a balance between conceptual learning that you can build upon throughout your career and practical skills that you can try out on Monday morning.

Learning

Aims

The general aims of this course are to:

1. Develop an appreciation for the theory and sensibilities of design.
2. Develop skills in the use and application of a variety of design methods, specifically applicable to user-centered design.
3. Improve individual and collaborative skills in design-based problem solving.

Objectives

On the successful completion of this course, you should be able to:

1. Given a problem setting, critically discuss the appropriateness of potential design methodologies such as contextual design, scenario-based design, task-based, participatory and value-sensitive design.
2. Critically discuss the merits of the waterfall model and rapid prototyping in user-centered design.
3. Describe the impediments to achieving a human-centered design process within organizations.
4. Discuss the various roles in information system design, including visual designers, interaction designers, information architects, design ethnographers, project managers, product managers, technical developers.
5. Gather useful information about users and activities through observation or systematic inquiry.
6. Use, adapt and extend classic design standards, guidelines, and patterns.
7. Employ selected design methods at a basic level of competence: affinity diagrams, card sorting, claims analysis, scenarios of use, personas, use cases, task analysis, social impact statements, conceptual modeling, heuristic evaluation, and usability evaluation.
8. Employ notation to specify information structure and flow.
9. Employ wire-frames to describe appropriate arrangement of navigation elements (e.g., global versus local navigation) and dialog controls (e.g., fields, checkboxes, radio buttons, select lists, etc.).
10. Create a paper prototype for a small system and plan and perform a usability evaluation.

Assessment

The assignments strike a balance between theory and practice and between individual and group work.

Assessment	% Grade
Weekly writing exercises	40%
Design activities	50%
Participation	10%

Weekly writing exercises

The objective of the writing exercises is to prompt you to study the readings carefully, to develop an understanding for the authors views, and to take a position on them. I will use your written statements to structure our class discussions and, of course, you may also be asked to defend or elaborate your position in class.

You will use e-Submit to submit your weekly writing exercises. The exact process to be followed is explained on the coversheet for the writing exercises.

Your work must be submitted by 6:00 AM on the day that it is due. Responses that are late will not be graded. You can submit up to eight writing exercises. The top six scores will count in the calculation of your final grade and are worth 40% overall.

Design activities

During each class we will engage an activity that demonstrates the application of a particular method for design of interactive systems. Outside of class, you will be asked to continue with the activity, either writing a reflection about the uses, strengths, and weaknesses of the method or elaborating it in some way.

Five activities will be assigned, worth a total of 50%. All assignments are due at the beginning of class. You may complete these design activities alone or in groups of two or three. If you work in a group, each member of the group must each equally participant in all aspects of the activity.

Participation

IMT-540 should be challenging, interesting, and fun! With spirit and a professional manner, we can create a supportive and rewarding learning environment. Among the things you can do are:

1. Treat all with respect – be constructive in all discussions
2. Come to class prepared – read carefully and be ready for discussion
3. Be an active listener – be attentive, be engaged, use in-class technology with discretion
4. Ask challenging questions, participate in discussion
5. Challenge, build on, or clarify what others have done or said
6. Post useful or interesting information to the class discussion list
7. Visit the instructor during office hours to chat, to ask questions, or to give feedback.

Deliverable	Due	Week
Personal Statement #2	Dec 11	#11

Please write a 2 or 3 paragraph personal statement on your contributions to the class. Your reflection could explore such things as how you have sought to improve the learning environment, your personal goals for participating, how your experiences contributed to our learning, and so on. You might focus on lessons learned and things that you will try in subsequent classes, difficulties you encountered in your learning and how you addressed them and so on. Your participation is worth 10% of your final grade.

Submitting this statement is optional. If you submit one, I will use it to help assign your participation grade.

Standard cover sheet

To protect your privacy when work is returned and to facilitate communication, submitted work must have a cover sheet. The cover sheet must include the following information and be formatted nicely:

- Course name
- Quarter, program, department, and university
- Assignment name
- Your name and e-mail address
- A date
- A web site address (if relevant).

Staple the exercise pages to the cover sheet.

Late policy

If you will miss the deadline for a piece of work, you should inform the instructor as soon as you can, indicating when you will submit the work. The instructor will seek to accommodate your needs.

Right to revise

The instructor reserves the right to revise this syllabus.

Re-grading policy

To have work re-graded, please submit a Re-grade Request within five days of when your work was returned. The request must be a single page, sent by e-mail. It should contain the following information:

- Re-grade Request
- The information contained on the standard cover sheet
- An explanation for why you believe you deserve a higher grade.

The instructor will consider your request and, if warranted, will re-grade your work.

Guidelines on using e-mail

When communicating with the instructor, please follow these guidelines:

- You are welcome to give feedback to the instructor about the course, to ask a question about an assignment, to share an interesting article or resource, to report that you will be absent from a class/lab, to request additional time for an assignment (because of significant health, personal, or educational matter), or similar communication ;
- Whenever appropriate, please copy the class listserv with your question or comment;
- E-mail concerning assignments might not be replied to if it is sent within 36hr of the assignment due date;
- If your e-mail concerns your grade, please follow the re-grading policy (see above);
- E-mail that is sent on Friday afternoon or over the weekend is usually read on Monday or Tuesday of the following week;
- If you don't receive a reply within 2 days or so, please resend your e-mail or ask about it during class or lab.

Class Schedule

Most classes will follow the same basic pattern. We will begin with a short lecture on the key concepts for the week. Then, we will move to a class discussion of the readings. The aim of the class discussion is twofold: To thoroughly understand the authors' views and to critically examine how they can be applied to the design of information systems. Then, we will pursue an in-class activity where we will analyze a problem and work towards a design solution using a particular method. The class will end with a reflective discussion of what we learned by engaging the activity. This weekly pattern will allow us to both *practice skills* and develop a *conceptual appreciation* for design methods for interaction and systems.

To prepare for class, you will submit a writing exercise each week. Sometimes you will be asked to summarize and take a position on what you believe to be the most important (or problematic) ideas in the readings. Other times, you will be asked to write a reflective statement on what you've learned through the readings, drawing particularly on your own views and experiences. I will use these statements to structure our class discussions.

The readings are listed by class meeting and then by suggested reading order. All of the papers are available either at a digital library (you may need to authenticate through the UW Libraries) or in a UWID password-protected area of the course website.

From time to time, additional background readings are included. Do not read them, unless you really want to! The instructor may draw upon them occasionally and perhaps they will be useful in your own future studies or at work.

Week 1: No class meeting (Oct 1)

*** Class preempted for IMT-500B – no readings

Week 2: The Character of Design (Oct 9)

Design is neither art nor science. This week we set the stage for the entire class and examine the nature of “design,” especially within complex, interdisciplinary organizations, and contrast this unique form of inquiry with “research.” The major questions are: What is design? What is research? How do they relate? What is interaction design, usability engineering, and human-centeredness? What is a method and what is a methodology?

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| Read | Rittel, H. W. J. & Webber, M. M. (1973). Dilemmas in general theory of planning. <i>Policy Sciences</i> , 4, 155-169. |
| | Mountford, J. S. (1990). Tools and techniques for creative design. In B. Laurel (Ed). <i>The Art of Human-Computer Interface Design</i> (pp. 17-30). Reading MA: Addison-Wesley. |
| Other | Löwgren, J. & Stolterman, E. (2004). <i>Thoughtful interaction design: A design perspective on information technology</i> . Cambridge, MA: MIT Press. |
| | Nelson, H. and E. Stolterman (2003). <i>The Design Way: Intentional Change in an Unpredictable World: Foundations and Fundamentals of Design Competence</i> . New Jersey: Educational Technology Publications. |

Week 3: Empathy and Studying Context (Oct 16)

This week we shall examine the concept of “empathy” and methods for studying interaction in context. The major questions are: How do we discover and understand human capacities, needs and desires? How do we study work and play in all its complexity for the purpose of design?

- Read Leonard, D., & Rayport, J. F. (1997). Spark innovation through emphatic[sic] design. *Harvard Business Review*, 75(6), 102-113.
- Friedman, B. (2004). Value Sensitive Design. *Encyclopedia of human-computer interaction*. (pp. 769-774). Great Barrington, MA: Berkshire Publishing Group.
- Holtzblatt, K., & Beyer, H. (1993). Making customer-centered design work for teams. *Communications of the ACM*, 36(10), 92-103. Retrieved 1 Dec 2004 from <http://doi.acm.org/10.1145/163430.164050>
- Other Beyer, H. & K. Holtzblatt (1998). *Contextual Design: Defining Customer-Centered Systems*. New York: Morgan Kaufmann Publishers.
- Laurel, B. (Ed.). (2003). *Design research: Methods and perspectives*. Cambridge, MA: MIT Press.
- Kelley, T. (2001). *Art of Innovation*. New York: Currency.

Week 4: Artifacts and Studying Use (Oct 23)

This week we shall investigate the problem of describing artifacts and making predictions about how people will likely interact with them. We shall investigate two methods: heuristic evaluation and Norman’s design vocabulary.

- Read Norman, D.A. (1988). *The Psychology of Everyday Things*, New York: Basic Books. [Chap. 1-3 only].
- Nielsen, J. (1994). Heuristic Evaluation. In J. Nielsen & R. L. Mack (Eds.) *Usability Inspection Methods* (pp. 25 – 62). New York: John Wiley & Sons.
- Other Johnson, J. (2000). *GUI Bloopers: Don’ts and Do’s for Software Developers and Web Designers*. New York: Morgan Kaufmann Publishers.

Week 5: Design Representations (Oct 30)

Design representations are used to envision, study, and communicate future possibilities. Representations are central to any design methodology. This week we shall investigate the theory and practice of two popular design representations – personas and scenarios.

- Read Carroll, J. M. (1999). Five Reasons for Scenario-Based Design. In HICSS '99: *Proceedings of the Thirty-Second Annual Hawaii International Conference on System Sciences*-Volume 3, 3051. Retrieved from <http://csdl.computer.org/comp/proceedings/hicss/1999/0001/03/00013051.PDF>
- Pruitt, J., & Grudin, J. (2003). Personas: practice and theory. In *DUX '03: Proceedings of the 2003 conference on Designing for user experiences* (pp. 1-15). ACM Press. Retrieved from <http://doi.acm.org/10.1145/997078.997089>

- Other Carroll, J. M. (2000). *Making Use: Scenario-Based Design of Human-Computer Interactions*. Cambridge, MA: MIT Press.
- Rosson, M. B., & Carroll, J. M. (2002). *Usability Engineering: Scenario-based Development of Human-Computer Interaction*. New York: Morgan Kaufmann Publishers.

Week 6: Prototyping (Nov 6)

Prototyping is an extremely effective method for envisioning future systems. This week we shall examine several different kinds of prototyping, and focus particularly on paper prototyping.

- Read Rettig, M. (1994). Prototyping for tiny fingers. *Communications of ACM*, 37(4), 21-27. Retrieved from <http://doi.acm.org/10.1145/175276.175288>
- Other Snyder, C. (2003). *Paper Prototyping*. New York: Morgan Kaufmann Publishers. [See also <http://www.paperprototyping.com>]

Week 7: Usability Evaluations (Nov 13)

Iterative design and evaluation is the most common and probably the most effective approach for improving the usability of an information system. This week we shall examine the process of planning and running a usability evaluation.

- Read Greenberg, S. (2003). Working through task-centered system design. In D. Diaper & N. Stanton (Eds.) *The Handbook of Task Analysis for Human-Computer Interaction*. New York: Lawrence Erlbaum Associates.
- Krug, S. (2000). *Don't Make Me Think: A Common Sense Approach to Web Usability*. Indianapolis, IN: New Riders Publishing. [Chap. 8 and Chap. 9]
- Other Nielsen, J. (1994). *Usability Engineering*. New York: Morgan Kaufmann Publishers.
- Rubin, J. (1994). *Handbook of Usability Testing: How to Plan, Design, and Conduct Effective Tests*. New York: John Wiley & Sons.

Week 8: Human-Centered Design and Organizations (Nov 20)

Embedding human-centered design methodologies within organizations is notoriously difficult. Why is it difficult and what can be done about it? This week we shall examine the problem and explore solutions.

- Read Poltrock, S. E. & Grudin, J. (1994). Organizational obstacles to interface design and development: two participant-observer studies. *ACM Transactions on Computer-Human Interaction*, 1(1), 52-80. Retrieved from <http://doi.acm.org/10.1145/174630.174633>
- Norman, D. A. (1998). *The Invisible Computer*. Cambridge, MA: MIT Press. [Chap. 10]
- Other Vrendenburg, K., S. Isensee & C. Righi (2002). *User-Centered Design*. Upper Saddle River, NJ: Prentice Hall.
- Winograd, T. (Ed.) (1996). *Bringing Design to Software*. New York: Addison-Wesley.

Week 9: No class meeting (Nov 27)

*** Thanksgiving – no readings

Week 10: Design Vocabularies: Guidelines and Patterns (Dec 4)

Knowledge for how to design usable, useful, and enjoyable systems can be captured in various ways. We are, for example, already familiar with the method of heuristic evaluation (week #4). This week we shall examine two additional approaches – guidelines and patterns – for capturing and using design knowledge.

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| Read | Erickson, T. (2000). Lingua francas for design: Sacred places and pattern languages. <i>Proceedings of DIS '00</i> (pp. 357 – 368). New York, NY: ACM Press. Retrieve http://portal.acm.org/citation.cfm?id=347642.347794 |
| Other | Erickson, T. (2006, August) Interaction Design Patterns. Retrieved from http://www.visi.com/~snowfall/InteractionPatterns.html |
| | Johnson, J. (2000). <i>GUI Bloopers: Don'ts and Do's for Software Developers and Web Designers</i> . New York: Morgan Kaufmann Publishers. |
| | Van Duyne, D.K., Landay, J.A., and Hong, J.I. (2003). Creating a navigation framew <i>The Design of Sites: Patterns, principles, and process for crafting a customer-c web experience</i> . Reading MA: Addison-Wesley. |

Week 11: Information Systems, Social, and Environmental Sustainability (Dec 11)

This week we will examine two long-term trends in design. Please read either one of these papers or both!

- Blevis, E. (2007). Sustainable Interaction Design: Invention & Disposal, Renewal & Reuse. *Proceedings of 25th Conference on Human Factors in Computing Systems, (CHI 2007)*, ACM Press, 503-512.
- Pinkett, R. D. (2007). The creating community connections project: Social and cultural approaches for engaging low-income communities. In J. Lazar (Ed.), *Universal Usability: Designing Computer Interfaces for Diverse User Populations* (pp. 457-486). Hoboken, NJ:Wiley & Sons.

Students with Disabilities

To request academic accommodations due to a disability, please contact Disabled Student Services: 448 Schmitz, 206-543-8924 (V/TTY). If you have a letter from DSS indicating that you have a disability which requires academic accommodations, please present the letter to me so we can discuss the accommodations you might need in the class.

Academic accommodations due to disability will not be made unless the student has a letter from DSS specifying the type and nature of accommodations needed.

Grading Criteria

General grading information for the University of Washington is available at:
http://www.washington.edu/students/genecat/front/Grading_Sys.html

The iSchool has adopted its own criteria for grading graduate courses. The grading criteria used by the iSchool is available at:
<http://www.ischool.washington.edu/resources/academic/grading.aspx>

The UW undergraduate grading guidelines, used by the iSchool and available at
<http://depts.washington.edu/grading/practices/guidelin.htm>, may be used in this class.

Grade	Performance Quality
4.0	Exceptional work for a graduate student. Work at this level is consistently creative, well-reasoned, insightful, and well-written and shows an incisive understanding of the material.
3.7 - 3.9	Strong work for a graduate student. Work at this level is mostly creative, well-reasoned, insightful, and well-written and shows a solid understanding of the material. Work is very good, but it could be improved.
3.3 - 3.6	Competent work for a graduate student. Work at this level is often creative, well-reasoned, insightful, and well-written and shows mostly adequate understanding of the material.
3.0 - 3.2	Acceptable work for a graduate student. Work at this level is generally creative, well-reasoned, and well-written and shows acceptable understanding of the material. Work is competent but shows some flaws or difficulties.
2.7 - 2.9	Minimally passing work for a graduate student. Work at this level is occasionally creative, well-reasoned, and well-written and shows some signs of understanding the material but numerous errors, inconsistencies, or other problems are present.
2.6 & below	Deficient work for a graduate student. Work at this level does not meet the minimal expectations for graduate level work. Work is inadequately developed and lacks understanding of the material.
2.0	Unacceptable work for a graduate student. Misunderstood the nature of the work required or shows very little understanding of the material.
1.0	Incomplete / Totally inadequate work for a graduate student
0.0	Work was not turned in

Academic Integrity

The essence of academic life revolves around respect not only for the ideas of others, but also their rights to those ideas and their promulgation. It is therefore essential that all of us engaged in the life of the mind take the utmost care that the ideas and expressions of ideas of other people always be appropriately handled, and, where necessary, cited. For writing assignments, when ideas or materials of others are used, they must be cited. The format is not that important—as long as the source material can be located and the citation verified, it's OK. What is important is that the material be cited. In any situation, if you have a question, please feel free to ask. Such attention to ideas and acknowledgment of their sources is central not only to academic life, but life in general.

Please acquaint yourself with the University of Washington's resources on [academic honesty](http://depts.washington.edu/grading/issue1/honesty.htm) (<http://depts.washington.edu/grading/issue1/honesty.htm>).

Students are encouraged to take drafts of their writing assignments to the Writing Center for assistance with using citations ethically and effectively. Information on scheduling an appointment can be found at: <http://depts.washington.edu/iwrite/>

Copyright

All of the expressions of ideas in this class that are fixed in any tangible medium such as digital and physical documents are protected by copyright law as embodied in title 17 of the United States Code. These expressions include the work product of both: (1) your student colleagues (e.g., any assignments published here in the course environment or statements committed to text in a discussion forum); and, (2) your instructors (e.g., the syllabus, assignments, reading lists, and lectures). Within the constraints of "fair use", you may copy these copyrighted expressions for your personal intellectual use in support of your education here in the iSchool. Such fair use by you does not include further distribution by any means of copying, performance or presentation beyond the circle of your close acquaintances, student colleagues in this class and your family. If you have any questions regarding whether a use to which you wish to put one of these expressions violates the creator's copyright interests, please feel free to ask the instructor for guidance.

Privacy

To support an academic environment of rigorous discussion and open expression of personal thoughts and feelings, we, as members of the academic community, must be committed to the inviolate right of privacy of our student and instructor colleagues. As a result, we must forego sharing personally identifiable information about any member of our community including information about the ideas they express, their families, life styles and their political and social affiliations. If you have any questions regarding whether a disclosure you wish to make regarding anyone in this course or in the iSchool community violates that person's privacy interests, please feel free to ask the instructor for guidance.

Knowing violations of these principles of academic conduct, privacy or copyright may result in University disciplinary action under the Student Code of Conduct.

Student Code of Conduct

Good student conduct is important for maintaining a healthy course environment. Please familiarize yourself with the University of Washington's Student Code of Conduct at:

<http://www.washington.edu/students/handbook/conduct.html>