

# Human Factors in Information System Design

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## ISMT S-170 (Course #32596) Harvard Summer School - Summer 2015 Course Syllabus

### Instructor Team:

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While many organizations have outsourced the design of production systems, the recent Internet and e-commerce explosion has created an even wider need to design corporate web sites. These sites are developed by people of various backgrounds, but organizational practices must exist to make sure they take into account what we know about human factors engineering. This course focuses on how to gather requirements, achieve a usable first draft, and test and improve that draft. A half-dozen course projects will include usability critiques and designs. As the course progresses, your critique will become a fact-finding mission, then a design project, then a set of prototype screens or storyboard.

The course is intended for anyone with special interest in usability, and will be especially useful for those who will manage projects, write code, or provide input to system or web development projects.

### Rationale and Learning Objectives:

Many of us know good and bad designs when we see them. However, creating those designs is another issue altogether. It is fascinating to observe how a well-designed system seems to be just plain obvious and intuitive. Although some people seem to have a knack for good design approaches, the designs almost never just emerge as easily as you might think. Rather than being divinely inspired, one must count not only on creative skills but also on the use of starting principles that have emerged over time, modeling the designs, and thoroughly testing those designs. As systems become more complex, much more preparation is needed. In theory, a large investment in design will result in lower training costs as well as higher efficiency and effectiveness in system use.

The course will provide a well-rounded view of Information Systems design in an organizational context, enabling you to:

- Find useful starting principles for designing systems, including websites and corporate systems.
- Model the new or improved system (web site, icon, production system)

- Scrutinize the design through analysis of use cases and testing with real users

ISMT S-170 works as a stand-alone course or it can directly augment a course on Analysis and Design of Information Systems. It can indirectly augment a course on Database Management and any subsequent course on programming by providing a context on which you can aim those technical weapons you've developed.

## Texts:

- Te'eni, Carey, and Zhang: *Human-Computer Interaction: Developing Effective Organizational Information Systems*, 2007, Wiley, ISBN 978-0471677659
- Norman, Donald A. *The Design of Everyday Things, Revised and Expanded Edition* New York: Basic Books (368 pages) 2013, ISBN-13: 978-0465050659
- Koyani, Sanjay J., Bailey, Robert W., and Nall, Janice R. *Research-Based Web Design & Usability Guidelines*, available free in book form or at <http://guidelines.usability.gov>

**Other readings:** A few additional readings will be assigned for each class. Many will report studies from our labs. Some might be replaced if any newer papers are finished during the course. These are listed in the order in which they are covered, and numbered for ease of reference in the schedule.

1. Galletta, D.F. (2006) "Human Factors and E-Commerce," chapter in *Electronic Commerce and the Digital Economy*, M.E. Sharpe, 91-111.
2. Galletta, D.F., Durcikova, A., Everard, A., and Jones, B. (2005) "Does Spell-Checking Software Need a Warning Label?" *Communications of the ACM*, Volume 48, Number 7, pp. 82-85.
3. Norman D. and Nielsen J., Gestural Interfaces: A Step Backward In Usability, *Interactions*, 2010
4. Nielsen Norman (2010/2011) Reports of iPad usability <http://www.nngroup.com/reports/ipad-app-and-website-usability/>
5. Galletta, D. F. and B.K. Dunn "Assessing Smartphone Ease of Use and Learning from the Perspective of Novice and Expert Users: Development and Illustration of Mobile Benchmark Tasks, *AIS Transactions on Human-Computer Interaction*," Vol. 6, Number 4, December, 2014.
6. Bewley, W.L., T.L. Roberts, D. Schroit, & W.L. Verplank, (1983). "Human Factors Testing in the Design of Xerox's 8010 'Star' Office Workstation," *Human Factors in Computing Systems - CHI '83 Proceedings*, December, 72-77.
7. Carroll, John M., "The Adventure of Getting to Know a Computer," *IEEE Computer*, 15(11):49-58, 1987.
8. Gould, J.D. & Lewis, C. (1985). "Designing for Usability: Key Principles and What Designers Think," *Communications of the ACM*, March, 28(3), 300-311. Available here. (This is a classic in the field).
9. Everard, A. and Galletta, D.F. (2005-2006) "How Presentation Flaws Affect Perceived Site Quality, Trust, and Intentions to Purchase from an On-Line Store," *Journal of MIS*, Volume 22, Number 3, pp. 55-95.
10. Galletta, D.F., Henry, R., McCoy, S., and Polak, P. March, 2006 "When the Wait Isn't So Bad," *Information Systems Research*, Volume 17, No. 1, pp. 20-37.

11. Chung, R. and Galletta, D.F. (2014) "Nature vs. Nurture: The Genetic Basis of Behavioral Security," Proceedings of 2014 IFIP 8.11/11.13 Dewald Roode Information Security Research Workshop, Newcastle, UK, June 16-17, 2014.
12. Boss, S., Galletta, D.F., Lowry, P.B., Moody, G., and Polak, P. "What Do Systems Users Have to Fear? Using Fear Appeals to Engender Threats and Fear that Motivate Protective Security Behaviors in Users," Forthcoming, *MIS Quarterly*.
13. Jagatic, Johnson, Jakobsson, and Menczer, "Social Phishing," *Communications of the ACM*, Vol. 50, October 2007, pp. 94-100.
14. Moody, G., Galletta, D.F., Walker, J., Dunn, B.K. "Which Phish Get Caught? An Exploratory Study of Individual Susceptibility to Phishing," ICIS 2011, Shanghai, December 3-6.
15. Galletta, D.F., Ahuja, M., Hartman, A., Peace, A.G., and Teo, T. (1995) "Social Influence and End-User Training," *Communications of the ACM*, V. 38, N. 7, pp. 70-79.
16. Ronen H. and Te'eni D (2011). Dynamic Personal Feedback in Acquiring Information to Manage Your Health. International Conference on Information Systems 2011, Shanghai, December, 3-6.
17. Shirkey, Clay and Carr, Nicholas: "Does the Internet Make You Smarter or Dumber?" "Weekend Journal" section of the *Wall Street Journal*, June 5-6, 2010, pp. W1-W2.

## Grading

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**Required** (all students – individual completion):

Mini-assignments (4 @ 5 pts. each) (individual) .....	20
Design Project Part 1: Bad Website (individual) .....	9
Design Project Part 2: Proposal (individual) .....	9
Design Project Part 3: Data Collection (Group) .....	7
Design Project Part 4: Design fixes (Group) .....	7
Design Project Wrapup: Final presentation (Group) .....	8
Quizzes (3@6) .....	18
Attendance .....	4
Participation .....	5
Peer evaluation .....	3

**Choose any one of the following additional individual assignments:**

Reality Checks .....	10 or
Book review .....	10 or
Research project proposal (especially useful for students headed to a PhD program) ...	<u>10</u>

Total .....	100
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Please refer to the detailed requirements of each assignment, stored on the Canvas site.

#	Date	Topic and Assignment Due the Night Before Class	Reading Due
1	Tues June 23	Introduction	Te'eni Chap 1 Galletta (2006) <sup>1</sup>
2	Thurs June 25	<b>Assignment Zero (zero credit)</b> Organizational and Business Context Interactive Technologies	Te'eni Chap 2 (skim only), Chap 3 Galletta Durcikova Everard Jones (2005) <sup>2</sup>
3	Tues June 30	<b>Back to the Future</b> Physical Engineering Norman: Psychopathology of Everyday Things; Psychology of Everyday Actions	Te'eni Chap 4 Norman Chap 1-2 Norman/Nielsen <sup>3</sup>
5	Thurs July 2	<b>Quiz 1</b> <b>User Misunderstandings</b> Cognitive Engineering Norman: Knowledge: Head and What to Do	Te'eni Chap 5 Norman chaps 3-4 Nielsen/Norman <sup>4</sup> Galletta & Dunn (2014) <sup>5</sup>
6	Tues July 7	<b>Design Project Part 1: Bad Site</b> Affective Engineering Norman: Human Error	Te'eni Chap 6 Norman Chap 5 Bewley et al. (1983) <sup>6</sup> Carroll (1987) <sup>7</sup>
7	Thurs July 9	<b>Text Screen</b> Evaluation Norman: Design Thinking	Te'eni Chap 7 Norman Chap 6 Gould & Lewis (1985) <sup>8</sup> Everard & Galletta (2005-2006) <sup>9</sup>
8	Tues July 14	<b>Design Project Part 2: Proposal to Fix the Site</b> Guest Speaker: Adam Smolinski from Microsoft Design Principles Norman: Design in the World of Business	Te'eni Chap 8 Norman Chap 7 Galletta Henry McCoy Polak (2006) <sup>10</sup>
9	Thurs July 16	<b>Quiz 2</b> Tasks in the Organizational Context Componential Design	Te'eni Chaps 9, 10 Koyani online book: skim the table of contents and read any 10 principles at random through the book to get an idea of the content
10	Tues July 21	<b>Icon Design</b> <b>Field Trip to Fidelity's Usability Lab</b>	
11	Thurs July 23	<b>Design Project Part 3: Data Collection</b> Development Methodology	Te'eni Chap 11
12	Tues July 28	<b>Research</b> <b>HCI Madness</b> Collaboration Behavioral Security	Te'eni Chap 12 Boss, Galletta, Lowry, Moody, Polak (2016) <sup>11</sup> Chung & Galletta (2013) <sup>12</sup> Jagatic (2007) <sup>13</sup> Moody et al. (2011) <sup>14</sup>
	Thurs July 30	<b>Design Project Part 4: The Redesign</b> Social and Global Issues	Te'eni Chap 13 Galletta Ahuja et al (1995) <sup>15</sup> Ronen & Te'eni (2011) <sup>16</sup> Shirky & Carr (2010) <sup>17</sup>
Final	Tues Aug 4	<b>Design Project Presentations</b> <b>Quiz 3</b> <b>Peer Evaluations</b>	

## Administrative Matters

Harvard has a well-defined process for many administrative matters. There are specific procedures for students with disabilities (please contact Academic Services at 617-495-0977 or [disabilities@dcemail.harvard.edu](mailto:disabilities@dcemail.harvard.edu)), religious conflicts, and makeups (only by appeal through the University). Also, taking attendance is required of me, especially during the early classes to allow waitlisted students to take the place of non-attending registered students. Given that you are taking the course for graduate credit and have obviously survived an undergraduate program, suffice it to say that your submitted work must be yours and yours alone unless the assignment is clearly labeled to be from your group. As you most likely know by now, there are severe penalties for academic dishonesty, which includes copying nearly any amount of text from a web site without quotation marks or attribution and any amount of copying from others. If you cite a source, simply use quotation marks around the section you are quoting and then insert an author name and year in parentheses, as well as a list of complete references. If you do this, as the only modestly funny joke goes, “cheating” becomes “research.” Because you are all held closely to it, you should be familiar with the academic integrity policy explained in <http://www.summer.harvard.edu/exams-grades-policies/student-responsibilities>.

## Student Responsibilities<sup>1</sup>

**Classroom conduct:** Please turn off cell phones and pagers (or set to “silent”). If you need to leave the classroom for any reason, please do so quietly to minimize disruption to the rest of the class. Also, please hold private conversations outside the classroom. If you know you will need to leave prior to the end of the scheduled time for the class session, please let me know before the class begins.

Your participation is important in the class. I will expect you to:

- Actively participate in classroom discussions, but not to dominate every conversation. I expect you to contribute regularly but also give others a significant chance as well.
- Ask questions to clarify material that is not understood
- Initiate meaningful discussions to extend analysis on topics of interest that are related to class material
- Please do not initiate loosely-related discussions just to be marked as “participating.” Other students would like to stick to the topics in the course as closely as possible. We keep track of comments that are off topic and discount them.
- Work in groups for several cases and projects. Obtain maximum value from this crucial aspect of this course.
- Come to class; In accordance with Harvard rules, you are expected to attend all classes, missing only rarely. There usually are students on a waiting list for the summer program courses, and we give preference to those who will engage in the courses fully. This course has enjoyed roughly 99% attendance over the past four years; don’t be the 1% who misses significant material.
- If you cannot come to any single class, please obtain the notes from another student – private tutoring will not be available to those who miss class. It is important to note that any announcements in any class session are official and apply to all students registered, not just those who attend that day.
- After class, if you still don’t understand a concept, please feel free to email and set up a meeting time. I’m happy to provide extra help when needed. Historically, the concepts have not been very difficult in this course but the workload is sometimes high.
- Please number your answers to all assignments so I can identify the answers.
- Due dates for all assignments are the evening before class at 11:59 PM so my grader and I have time to look them over before class on the following evening. Late assignments will encounter late deductions: 20% reduction between midnight and 6 AM; 40% reduction between 6 AM and noon; 60% deduction after noon; 80% deduction after 6 PM on the class day. Late assignments are unlikely to be used as examples in class.

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<sup>1</sup> Thanks to my colleague Andy Schwarz for a previous version of this section as well as the next “How to be Successful...”

## How to be Successful in this Course

I want you to be successful, not only in this course, but also in your future career. All of the material and assignments have been designed so that you are prepared for real life! To be successful in this course and your future career, consider a few suggestions:

1. Plan. You now have the syllabus for the course that includes all of the important dates. Keep track of the dates and plan your schedule around your work load.
2. Prepare. Be ready when you come to class – read the chapters and, print out the slides (if that is your practice), the day before class so that you are not rushed coming to class. Preparing while the semester is going along will make it easier around quiz time.
3. As stated above, the workload is high but the material is fairly straightforward. The skill we emphasize in this course is analysis, integration, and generalization of concepts in diverse contexts.
4. Ask questions. The only bad question is the one that you did not ask.
5. Be professional. Think of your instructors in any courses as bosses whom you want to impress – be professional with them and they will return the favor. Also, keep up your end of the workload in your groups.
6. View this class within the right context. As in your career, don't look for shortcuts – failing to learn course material will hurt you when you are looking for a job. Start planning for your success now by treating this course as you would a job.

## Mini-Assignment 1: Back to the Future

Your task is to search for depictions of future information technology and pick out what you believe is most representative of how you would like to interact with it. Don't get too wild: That is, don't invent the obvious ultimate machine that would read your mind and do everything not only that you think of, but also what you fail to think of.

Only choose INFORMATION technology that is feasible in the foreseeable future rather than highly specialized single-function items. For instance, it would normally be a poor choice to choose a new type of highly effective washer/dryer, a new medical instrument, or a great new model Bose speaker. Even though many of these have computers inside them, or are even connected to the Internet, they would be unlikely to change your work or personal life substantially. An example of a good choice from the past is Google Glass, which could in fact change the way you work, interact, and play.

Find a short video (searching on YouTube or other sources) about the future technology that you would want to show the class if you were able. The ideal length would be 2-3 minutes to provide focus, but the absolute limit will be determined by the subject matter. You can get the video from any source, including YouTube, vendor sites, movies, etc. Due to the size of the class, only selected videos can be shown. For this step, merely copy and paste the URL and perhaps give instructions ("start at x:xx" or "click the 2nd video from the top")

1. Provide a list of advantages afforded by this technology. Tell us what problems this technology will solve. Refer to our list of outcomes from class to evaluate ease of use or usefulness. What can be made faster? More accurate/effective? With less effort/stress? More interesting/fun? Easier for intermittent use?

2. Now, go past the hype and spoil our excitement. What will be slower? Less accurate/effective? More effortful/stressful? Less interesting/less fun? Easier to forget how to use it?

### **Mini-Assignment: User Misunderstandings**

As described in Class 1/2, there is a famous story about a user not being able to find the “any” key on his keyboard, so he called tech support to find out what to do when the documentation said to “hit any key.” Another story tells us about the person who broke the “cupholder” on his computer and called tech support. It was determined that the “cupholder” was actually a CD tray. These stories have been published on line in the past. A good source is the “Computer Stupidities” page at

<http://www.rinkworks.com/stupid/>. Your job is to find the funniest story you can. You are permitted to use any other resources on line or in print to find such stories.

Usually the reason for these funny situations is a result of an interaction between user misunderstandings, often caused by unfamiliar words, sometimes as synonyms and homonyms. Also, often they are caused by poor design choices.

The deliverables are:

1. Indicate the source of your story (web address, etc.)
2. Provide the story (the only time you can copy and paste in this course!)
3. Explain why the person had this misunderstanding (Bad design choice? Poor mental model? Unanticipated conflict between user knowledge and designer knowledge?)
4. Describe how the problem might be prevented in the future

For example, the “any key” person could not differentiate between key words and common words, and the designer of the documentation did not realize that people need to differentiate the two. The “cupholder” person was not familiar with the concept of a CD-ROM, and the designer decided to leave a round hole in the bottom for mechanical engineering reasons.

### **Mini-Assignment: Text Screen Design**

The goal of this assignment is for you to try and apply some of the screen design issues discussed in the text, and to discover how difficult it is to design even a simple output screen. We will use software to evaluate your screen, however, your grade will be assigned by your instructor. NOTE: This assignment has nothing to do with your design project!

Note: if you follow all the instructions, you will easily earn a perfect 5 points on this. Many students, however, fail to save as a TXT file, or insert TABs, or provide only one order line with quantity 8. Read these instructions carefully or you will lose points by being careless. This is part of what a User Centered Design requires: Careful attention to detail.

You are to develop ONE information (not input) screen that contains the requisite information (see below) on an invoice of your design. The contents of the screen should show:

1. identifying information like company (filling the order) name and system/screen information;
2. customer information like name, billing address, and shipping address;
3. item information like description, price, quantity and product number showing exactly 8 rows, or lines, of items purchased (at least one item each of eight different products).
4. some kind of total and any other information of your choice at the bottom.

The design challenge is that you need to assume you are using an old-style computer with a fixed number of lines (22), a fixed number of columns (characters) wide (80, except that you can have shorter lines), and no graphics at all. Don't create dashes or use any tabs. Use spaces, NOT TABS, and use RETURNS (ENTERS for carriage returns and line feeds), to provide vertical distance between disparate items. Do not use boldfacing, italics, or underlining. Do not use any design tools that create graphic images or proprietary file formats.

Note that it says "you can have shorter lines," meaning that you don't have to pad spaces all the way over to column 80. If a line is only 42 characters wide, for instance, just press ENTER and you can go on to the next line.

Name your file with the first 8 characters of your last name then a file extension of .TXT. Do not use a proportionally-spaced font. Use Courier if you draft this in Word. It is critical to save it as a "text" file, txt—don't save it in any "rich text" format such as RTF, DOC, DOCX, etc.

Useful tip: keep track of spacing by using a line at the top 123456789012345...etc and then fill in the information screen below that line, using it to measure the width of your report screen. Make sure to delete that top line before handing in your masterpiece.

Finally, do not pad spaces with a letter such as "X" (eg., ThumbDriveXXXXXXXX). If an item is short, just use the space bar to leave blank spaces to the right of the item as you move towards the next item. And again, most importantly, do not use tabs. Space over to where you want the information to show up on every line. Press ENTER at the end of each line. If some information goes only to the 70th column, then don't bother padding spaces before pressing ENTER. Just press ENTER at the end of the contents of any of the 22 lines of your screen.

I will evaluate your screens using software developed by Tullis, described in a prior reading. A few examples will be shown in class along with the report provided by the Tullis software. You will receive a complete report about your particular design.

## **Mini-Assignment: Icon Design**

Most people encounter graphical user interfaces everywhere these days, which include icons that a person must recognize and click. For example, in Microsoft Word, there is a "find" icon that looks like a pair of binoculars and a "print" icon that looks like a little printer. These icons do not just "happen," and are often the result of careful design, rigorous testing, and endless modification.

This is difficult work. Your proof that the icons are not obvious is in this assignment, and you have evidence all around when you use an unfamiliar package and cannot figure out what some of the icons



mean. Those are design failures. The Bewley, et al. reading discusses the development of computer icons for the Xerox Star, predecessor to the Apple MacIntosh and Windows. After reviewing these materials, you should have a good idea of the difficulties involved in designing icons.

You will be using a graphics program (see below) to design the icons. The objectives of this assignment are twofold: (1) to give you some practice in, and understanding of the difficulty involved in designing an icon, and (2) to give you some practice in, and understanding of the difficulty involved in making it legible in a tiny space on the screen.

Before you begin the steps below, imagine you're designing an Excel icon. Scan several of the icons on Excel and notice (1) how much meaning is expressed in each one that captures its function, (2) how well differentiated its drawing is from the other icons, and (3) how creative it is in expressing its specialized meaning. Your icons will be given points by me and by your peers on each of these criteria (meaning, differentiation, and creativity) in creating your three icons.

**IMPORTANT:** You need not provide any functionality; in class we will only focus on the three icons themselves.

If you use a Windows PC, a free icon editor called "Greenfish Icon Editor Pro" is a good bet for this assignment, but you can use any package. Please download Greenfish [here](#) (View in a new window) and install it. Please set it (or any other icon editor or drawing program) to 32x32 for the assignment. Any larger and it is a less useful assignment. You will be disqualified from voting if you use a higher resolution than 32x32. You will also lose points in what should be an easy 5-pointer for you.

Ideally, you will have an .ico file when you are finished. You can also use jpg or jpeg in a pinch. Please do NOT provide GIF or BMP files to avoid deductions. Create an .ico, .jpg, or .jpeg file for each required icon using the graphics software to create it properly. Also do NOT combine them into a zip file. Please upload them separately.

With any downloads, beware of any options to change your browser. Don't download this software from other locations (such as CNET) because you have to load an advertising-based installer.

Required:

1. Create an icon that would center a title line on the screen, assuming the user has highlighted the range containing the cell (at the left) in which there is a title, and the cells over which it is to be centered. Name this icon with a 1 plus your last name and the word center. (if your name were Billy Bob, it would be 1BobCenter.ico)
2. Create an icon that would (given the user has selected a range) sum all columns and sum all rows in the selected range, placing the row totals to the right of each row of the range and placing column totals at the bottom of each column under the range. (many spreadsheets have this simple format...for example, in a list of products sold with each product as a row and each month as a column, this macro will create totals for each product across the months and each for each month across products. Name this one with a 2 plus your last name and the word sum. Billy Bob would name the file 2BobSum.ico)

3. Create an icon that would allow the user to select a range with column/row totals, and have the spreadsheet make sure the column totals equal the row totals. Billy Bob would name the file 3BobAudit.ico

## Design Project Parts 1-4

The Design Project includes a series of five Design Project steps in this course. The first two are individual project steps. We will begin by finding a problematic ("bad") site, Then you will evaluate in Part 2 it as a potential target for your future design steps. Then after forming groups, move on to Parts 3 and 4. in Part 3 you will develop a set of needs by interviewing likely users of the site, timing their performance, and providing conclusions about what the site should be in the future. Finally, in Part 4, due at the end of the course, you will develop fixes in the form of an improved design, and explain your design choices. The final presentation should be a YouTube video or narrated PowerPoint deck, in which you tie together all four parts of the project, refined if necessary, and tied together into a cohesive design document.

### Part 1: Bad Site

This is an important step. To prevent having to start over for Parts 2 through 4, choose carefully here. Choose a hobby, organization, or shopping site you care enough about to deal with it for the entire course. If you have a job that has a poor intranet, you might be able to help the IT people at work at the same time as you satisfy course credit.

Most people encounter unfamiliar Websites often, in everyday situations such as shopping, finding information about products, registering for classes, visiting a medical doctor, etc. Some sites require a bewildering amount of clicking and backtracking, repeated sign-in, and responses to undecipherable questions.

Your job is to:

1. Find an example of a site you have seen and have judged to have terrible qualities. Please provide the URL of the site as well as a screen capture (actually, active window capture) in case it changes. For the screen capture, you can make sure the window is active, then press ALT-PrtSc (Alt-Printscreen) to capture just the browser window to the clipboard. Then you can with CTRL-V paste the clipboard contents into Word. You are welcome to capture a few screens to illustrate the problem.
2. Write a few sentences to describe what is bad about the site.
3. Write a few sentences to explain why it might have been designed that way or evolved as such. This is where you try to understand how the designer could have done this to you without remorse.

We will discuss in class potential defenses, origins of the problems, and therefore perhaps the designer's side of the issue. The goal is for you to better understand the genesis of design problems and ultimately avoid creating such problems for others. We will not be able to go through everyone's in class.

Common length would be a couple of pages, covering perhaps two or three screens.

## Design Project Part 2: Proposal to Fix the Site

This part enables you to provide some definition of the value of continuing to focus on this site. Please answer the following questions:

1. Provide a context of the site's purpose. Of what value is the site? What benefits does it provide? Who uses it?
2. What would be gained by spending effort in fixing it? Time savings? More sales? Better decisions? You will be limited in what you can describe, but try to provide some ideas here of the benefits of improving the bad site.
3. Make a rough estimate of what would be required to fix it. Costs are not needed, but you might investigate who would need to work on it, and other systems that might be involved. You can state your answer in person-days, money, or even simply stating how many pages and files/databases would likely need to be changed.
4. Provide an idea of how #2 compares to #3. Do the benefits outweigh the costs? Or vice-versa?

## Design Project Part 3: Data Collection

At this point, you should be set up to form a team with up 4 other students (5 total per group).

With your team members, compare notes on the Bad Sites you uncovered, and jointly choose one to go ahead and try to fix in the next two parts of this project.

This assignment requires you to observe usage (by timing them) and also to interview them to uncover their needs. You will then provide conclusions about what the site should be in the future. In Part 2 you determined likely users of the site. So we will make use of them in this project.

1. Create any five representative and important benchmark tasks (using your own judgment) and time two users per team member who use the actual site. Provide a summary of timings for those tasks as well as a total time to accomplish the five tasks. For example, for an on-line store, it could include searching for a product, reading about it, adding it to the shopping cart, entering shipping information, and paying for it.
2. Before saying goodbye to the two users (per team member), interview them to see what they decide is needed for improving the site. They might discuss some of the problems you discussed in Design Project Part 1, and places they became stuck during the timing tasks. Or you might find that they discuss problems you never thought about. Provide an approximate transcript of what they discuss.
3. Evaluate the findings of the interviews. Do the following: (a) Sort/summarize the findings using any sensible categorization scheme. For instance, if efficiency is one of your issues, all comments about errors and also about slow speed would sort into that issue. (b) List any deviations from your Part 2 findings. That is, what areas did users uncover that you did not, and what areas did you uncover that users did not? (c) Evaluate the issues as to feasibility: cost (high, medium, low) and benefit (high, medium, low). Plot the issues to be fixed on X-Y axes with cost as the X axis and benefit as the Y axis.
4. Based on your data collection, provide decisions about what you believe should be done to provide maximum benefit. What improvements are most urgent? What changes are least urgent?

## Design Project Part 4: The Redesign

Part 4 is the culmination of your work to date. This assignment involves some creative work in redesigning website pages based on the previous findings, especially in Part 3. You might even be able to earn a bonus point.

Please do the following:

1. Provide some simulated site pages, using either PowerPoint, diagramming in Word, or actual site development (1 point bonus). Describe the new structure in a Word document (you can paste in copies of the pages from your PowerPoint slides to use as exhibits). Your changes should be significant in achieving better effectiveness, efficiency, or ease of use. Please do not focus only on aesthetics such as color or fonts.
2. Explain the improvements. Why did you make the changes you made? What benefits do you project?
3. If you do not have a real system, print the site pages and arrange the pages on a table. Time one new user per group member, while each "performs" the five benchmark tasks you developed in Part 3. They will "click" with their finger and then move to the next page. Provide the timings. Determine roughly if there has been an objective improvement.

## Design Project Presentation

The final step in your design project is to "sell" your design to management so that they will realize the importance of positive action.

In short, cover the key steps of the project, according to your own belief system. Cover them in a persuasive manner, taking about 10 to 15 minutes for each group. Please have each group member make part (at least a minute's worth) of the presentation. It is important to cover facts and figures to sell your work, otherwise you are just presenting something that might look better. Management needs to know that the investment is worthwhile.

You can use humor, but do it sparingly, be professional and describe your work carefully yet quickly.

Please upload your PowerPoint file by the time class begins.

## Research – Choose only One of Three Options

### Option 1: Reality Checks (10pts)

(Write your reflections on **two** articles/chaps. from **each of any 10 classes**--20 half-page discussions total)

Your assignment is to seriously evaluate or relate a good portion of the readings in this course to your own working or personal life, and to think towards the future.

- To satisfy this assignment, provide a list of "gems" for any two of the readings during each of 10 class sessions you can select. One should be taken from a chapter reading and one from an article. These gems should NOT be bulleted lists of content of the article, but rather your own assessment of what is useful from the particular reading. You will receive credit if the reflections are

thoughtful and interesting. They don't have to be Nobel-prize winning thoughts or even at all sophisticated. Mainly, something like the following would be great "three months ago I encountered this issue and here's what happened..." or "If my boss understood XXX or YYY, we would not have made this error in design."

- An excellent submission would provide at least 2 (any 2) of the following: (1) what you believe is valuable and why, or simply how practitioners could benefit from the material, (2) a particular situation that you were in that would have been different if the parties involved would have read it, (3) shortcomings of the article or chapter--that is, what is missing, and (4) future research that you think should be done in the subject area.

## Option 2: Book Video Review (10 pts)

Buy, rent, or borrow (but do not steal) any one of the following books. Read it and provide three Powerpoint slides and a 3-5 page paper about it.

Other similar books are also permitted with the permission of the professor. If you choose one of these, you do not need permission. If students choose interesting new ones, I might add them to this list as the semester goes on.

Cover the book in a comprehensive way (that is, don't just concentrate on chapter 1). Provide a written (3-5 page) review and for the HCI Madness portion of the final class, a short (1 minute, MAXIMUM) presentation. Students exercising this option should line up at the side of the class in alphabetical order (we will spend about 5 minutes arranging that at the beginning) and be prepared to move quickly to the podium. Your PowerPoint slides will all be combined into one deck and I'll provide a list of students in alphabetical order.

Provide your three PowerPoint Slides as described below:

- The main issues covered by the book (Slide 1)
- What is particularly valuable about the book (Slide 2)
- What seems to be missing or problematic in the book if you'd prefer a more polite title, you can consider this to be "Needs for future research." (Slide 3)

The sample titles requiring no permission, in alphabetical order:

- *100 Things Every Designer Needs to Know About People* by Susan Weinschenk
- *3D User Interfaces: Theory and Practice* by Doug A. Bowman, Ernst Kruljff, Joseph J. LaViola, Jr., and Ivan Poupyrev
- *Alone Together: Why We Expect More from Technology and Less from Each Other* by Sherry Turkle
- *Beyond the Usability Lab: Conducting Large-scale Online User Experience Studies* by Bill Albert, Tom Tullis, and Donna Tedesco ISBN-13: 978-0123748928
- *Designing Personalized User Experiences in eCommerce* (Human-Computer Interaction Series) by Clare-Marie Karat, Jan O. Blom and John Karat
- *Designing Interfaces* by Jenifer Tidwell

- *Designing Interactions* by Bill Moggridge
- *Don't Make Me Think* by Steve Krug (any of the 3 editions)
- *Emotional Design: Why We Love (or Hate) Everyday Things* by Donald A. Norman
- *The Elements of User Experience: User-Centered Design for the Web and Beyond* (2nd Edition) (Voices That Matter) by Jesse James Garrett
- *Human-Computer Etiquette: Cultural Expectations and the Design Implications They Place on Computers and Technology (Supply Chain Integration Modeling, Optimization, and Applications)* by Caroline C. Hayes and Christopher A. Miller
- *Lean UX: Applying Lean Principles to Improve User Experience* by Jeff Gothelf
- *Living with Complexity* by Donald A. Norman
- *Measuring the User Experience* by Tom Tullis and Bill Albert
- *The Man Who Lied to His Laptop: What Machines Teach Us About Human Relationships* by Clifford Nass, Corina Yen
- *Neuro Web Design: What Makes Them Click?* by Susan M. Weinschenk
- *The Impact of Tablet PCs and Pen-based Technology on Education: Going Mainstream, 2010* by Robert H. Reed and Dave A. Berque
- *Undercover User Experience Design (Voices That Matter)* by Cennydd Bowles, James Box
- *Universal Principles of Design, Revised and Updated: 125 Ways to Enhance Usability, Influence Perception, Increase Appeal, Make Better Design Decisions, and Teach through Design* by William Lidwell
- *Usable Usability: Simple Steps for Making Stuff Better* by Eric Reiss
- *Wired for Speech: How Voice Activates and Advances the Human-Computer Relationship* by Clifford Nass and Scott Brave

### Option 3: Experimental Research Proposal (10 pts)

This option is particularly useful for doctoral students or those intending to become doctoral students.

Please choose the topic only with my approval. There is an opportunity to work with the professor after the course is finished to actually conduct the study and publish the results. Carrying out the study is purely optional and will be outside the scope of the course (not graded). The end-product for this course should be a proposal for a study that has:

1. A research question or short set of questions with a convincing context (why it is important; what problem it will address)
2. Previous literature related to the question
3. A theoretical context: what might be predicted and why
4. Hypotheses motivated by the problem, the previous literature, and the proposed theory to use
5. A description of the methodology/materials that should be used to test the hypotheses

An example of a good proposal from the past is provided in the "Pages" section of Canvas (see the links to the left).