THEORIES AND PRACTICE OF DESIGN FOR INFORMATION SYSTEMS

David G. Hendry and Batya Friedman
The Information School
University of Washington
Box 352840
Seattle, WA 98195-2840
{dhendry,batya}@u.washington.edu

Course Description—In this course we explore the theories and practice of design – the intentional act of "changing an existing situation into a preferred one". We consider design for information systems from a variety of orientations: design by social process, design by reflective practice, design by hierarchical decomposition, design by appropriation, design by argumentation, and design by participation. Our overall aim is to “think like a designer.” Within each orientation, we read and discuss key papers, invent solutions to information design problems (in such areas as visual, interaction, and policy design), and reflect back upon our design practice in class and in writing. Each week, you can expect two or three readings and one interesting design problem. Though this cycle of practice and reflection, you will develop increasingly sophisticated design skills and sensibilities.

OVERVIEW AND SUMMARY

This document contains the syllabus and all materials for Theory and Practice of Design for Information Systems, a graduate course offered in Winter 2005 at the University of Washington. The aim of the course is to promote “design thinking” and to develop students’ skills and sensibilities for design. The course is designed for graduate students in Information Science, especially students with undergraduate training in science or social science but without any significant experience in design. For most students, this is their first class on design.

The course (3 credits) is organized for a 10-week quarter, with classes meeting once for 3 hours each week. In addition, students are expected to spend approximately 9 hours working outside of class. The course begins with an introduction to the character of design, which positions design as a distinctive form of inquiry, and ends with a design exposition, which prompts student groups of four to solve a design problem in 40 hr. For classes 2-9, students take a different perspective on design and engage a design activity, producing a physical artifact such as a poster, paper prototype, or physical 3D model. An example of such a perspective is Schön’s notion of Design as Reflection, which is covered in class 2.

This approach is unlike a traditional studio course, which assumes a significant level of maturity for design methods and engages a single, authentic problem over the entire course. This course, in contrast, equips students with a range of methods and perspectives that can inform subsequent research or coursework. Students develop skills in design thinking by a combination of careful reading, disciplined engagement of design activities over short time periods, and reflection on process. We believe that this methods approach is appropriate as an initial introduction for busy graduate students without a background in design.

Each week follows a similar five-part pattern:

1) Prepare for the week by reading a little on a design perspective;
2) Begin class with a discussion of the key ideas from the readings (approximately 1 hour);
3) In a disciplined fashion, engage a design activity from this perspective (approximately 1 hour);
4) Finish the class with a critical discussion of the process followed;
5) Finish the week with a short, reflective writing assignment, which is due the following week.

The emphasis throughout the course is on the quality of the reflection about how the activity was engaged and how the process unfolded rather than on critiques of specific artifacts.
The topics for the course are ordered roughly along a U shaped curve, with time scale on the Y-axis. This framework shows that perspectives on design tend to address different time scales of human action. The course begins with Design as Reflection, which emphasizes professional learning on the scale of years. Then moving down the U, it introduces Design as Social Process, which focuses on the importance of communication within design teams over weeks and months. Next, at the bottom of the U, it introduces Design as Hierarchical Decomposition, which is particularly suitable to analyzing tasks and activities with durations of seconds to hours. Then, it moves back up in time scale to cover Design as Participation, which focuses on durations of weeks and months, and finally to Design for Human Values, which can require social reform, lasting years and even decades. This ordering allows knowledge to be developed breadth-first through two passes of the time scale.

Fourteen students from a variety of disciplines, including Information Science, Computer Science, Technical Communication, and Geography, took part in the course. Overall, students expressed enthusiasm for the topics covered and the five-part pattern to learning. In anonymous feedback, students gave positive comments on the readings and design activities but sometimes remarked that the scope of the activities was overly ambitious. Several students commented positively on the combination of design activity and readings for learning about both the theory and practice of a particular approach to design. For some students, it was disappointing to only develop partial, conceptual solutions to problems in short time periods. Other students reported that exposure to the broad range of literature on design was stimulating and would be beneficial in subsequent work. These comments reflect the interesting trade-off between a studio class, which structures learning around a single problem, and a methods class, which structures learning around a series of small, distinct problems. For graduate students without a background in design and with commitments to other courses and research, we believe that on balance the methods approach is preferable.

The student feedback and our reflections on the course affirmed three guidelines. First, it is crucial, but not easy, to invent design activities that are interesting, that can be engaged without reading a significant amount of background material, and that reveal central features of a design perspective. Second, it is important to allocate time for in-class reflection and discussion after the completion of the design activity. While performing the design activities was challenging and exciting for students, the opportunity to reflect and talk about the solution and process was also valued. We think that much learning occurred through lively class discussions. Third, it is important to set expectations that the goal of the activities is not to generate complete solutions but rather to engage the activities with the discipline of a particular perspective and to reflect upon the process. It is easy to forget this in the excitement of developing innovative solutions. In future versions of this course, we would preserve the course structure and make incremental improvements to the readings and design activities.

In case you have questions or comments about this course, correspond with either instructor. Please let us know if you use or adapt these materials. We would be most interested in learning from your experiences!

Dave Hendry & Batya Friedman
June 1, 2005
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COURSE SYLLABUS

INSC 598 Theories and Practice of Design for Information Systems

Winter 2005

Instructors: Dave Hendry and Batya Friedman

Dave Hendry
330J Mary Gates
dhendry@u.washington.edu
Office Hours: Thursdays 11:00 AM – 12:00 PM and by appointment

Batya Friedman
370E Mary Gates
batya@u.washington.edu
Office Hours: Tuesdays 10:00 AM – 11:30 AM and by appointment

Class Meetings: Tuesday 12:30-3:20, 271 Mary Gates Hall
Class Web Site: Unavailable

Note: January 25, 2005 at 3:30 PM. UW CSE Distinguished Lecture by Terry Winograd, Stanford University titled “Designing for Fluent Interaction”

COURSE DESCRIPTION
In this course we explore the theories and practice of design – the intentional act of "changing an existing situation into a preferred one". We consider design for information systems from a variety of orientations: design by social process, design by reflective practice, design by hierarchical decomposition, design by appropriation, design by argumentation, and design by participation. Our overall aim is to “think like a designer.” Within each orientation, we read and discuss key papers, invent solutions to information design problems (in such areas as visual, interaction, and policy design), and reflect back upon our design practice in class and in writing. Each week, you can expect two or three readings and one interesting design problem. Though this cycle of practice and reflection, you will develop increasingly sophisticated design skills and sensibilities.
REQUIRED TEXTS


RECOMMENDED TEXTS

Additional course readings will be available from e-reserve.

ACTIVITIES AND ASSESSMENTS
Students will engage in four sorts of activities and assessments during the quarter.

- Intense Design, Interesting Problems (iDIP). Each week, there will be one intense interesting design problem. Most of these will be solved in class; some may require some outside work either before or after the in-class design session. Many will have a brief reflective write-up following the design experience.
- Short Writing Assignments. These will be assigned periodically throughout the quarter. We will frequently use these assignments to help focus discussion during a class meeting. Thus, NO late short-writing assignments will be accepted. Our expectation is that these writing assignments should be finished documents. In other words, assignments should be well organized, written clearly and concisely, and without spelling or grammatical errors.
- Design Exposition. A final design problem will be assigned during the 9th week to be completed before the last class of the quarter. Our last class meeting will be devoted to presentations of design solutions, including discussion of design process and rationale.
- Class Participation. Our course will be quite interactive. We expect you to come to class prepared to participate in discussions, ask hard questions, engage in design activities, and the like.

GRADING PERCENTAGES AND CRITERIA
55% Intense Design, Interesting Problems
20% Short Writing Assignments
15% Design Exposition
10% Class Participation

General grading information for the University of Washington is available at: http://www.washington.edu/students/gencat/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

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.
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. 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). 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://www.uwtc.washington.edu/resources/eiwc/

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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 university community violates that person's privacy interests, please feel free to ask the instructor for guidance.

READINGS
Jan. 4: The Character of Design


IDEO Method Cards. 51 Ways to Inspire Design. (2003). IDEO. San Francisco, CA: William Stout Architectural Books. [We will be bringing these to class.]
Jan. 11  Design as Reflection


Recommended:


Jan. 18: Design as Social Process


Recommended:


Jan. 25: Design as Dialog


DISTINGUISHED LECTURE
SPEAKER: Terry Winograd, Stanford University
TITLE: Designing for Fluent Interaction
DATE: Tuesday, January 25, 2005
TIME: 3:30 pm
PLACE: EE-105

ABSTRACT:
As the world of computing moves away from individual interactive devices towards ubiquitous computer augmented environments, new issues of usability arise and others take on increased importance. In this talk I will present what we have learned from some experiences in computing "off the desktop" and discuss how we might extend theories that have been applied in HCI to cope with some of the new challenges and opportunities.

Feb. 1: Design as Hierarchical Decomposition


Feb. 8: Design as Composition and Pattern Making: The Debate


Feb. 15: Design as Invention
Petroski, H. (1996). Invention by design: How engineers get from thought to thing. Cambridge MA: Harvard University Press. (Chapters 1 [intro], pp. 1-7; Chapter 3 [pencil], pp. 43- 65; Chapter 7 [airplanes & computers], pp. 120-140.)


Guest Designer: XYZ, xyz
Feb. 22: Design as Participation


Mar. 1: Design for Human Values


Mar. 8: Design Exposition

No new readings
THE CHARACTER OF DESIGN

On Tuesday, January 4 we’ll begin a discussion about the character of design. We’ll approach this discussion in two ways: first with an overview of tools and techniques for creative design and, second, with an examination of the qualities that differentiate design from other types of problem solving. This discussion will be with us throughout the quarter.

To prepare for our first class meeting, please read the following two articles:


You can find copies of these articles on e-reserve from the class web site. The class web site can be found at: unavailable

Select e-reserve from the website, type in your UW Net ID and password when prompted, read and accept the use agreement, and then select the specific articles.

MOUNTFORD ARTICLE

Joy Mountford was a Manager of the Human Interface Group at Apple Computer. In this paper she brings together a range of successful tools and techniques for design. Here are some questions to keep in mind as you read this article. Try to do two things here: Think about how Mountford would answer each of these questions. Then decide for yourself how you would answer each of these questions.

1. What’s the relationship between creativity and design?

2. Can creative design be stimulated or prescribed through activity?

BRAINSTORM a list of any other techniques that you (or others you know) have used in the past to stimulate creative thinking and design. WRITE a brief description (1-2 sentences) of each technique. Please bring your list with you to class on Tuesday. We’ll collect these.

RITTEL AND WEBBER ARTICLE

Now read the article by Rittel and Webber. In contrast to Mountford whose focus is on communication and media, Rittel and Webber take a systems approach to design. They raise the thorny issue that while we may be able to generate design solutions, we may have no rationale way to choose among them. Please keep these questions in mind while you read:

1. What do Rittel and Webber mean by a “wicked” problem? How do you know one when you see one?

2. What do Rittel and Webber mean by a “tame” problem? Do any of these exist?

3. Rittel and Webber claim problem definition is itself a hard problem for design. On what basis do they make this claim? Are you swayed by their arguments?
Black Squares*

By using four black squares of any size, cut from construction paper, create four compositions that express each of the following concepts (12 sketches in total):

- Order
- Tension
- Calm

Now, select the best alternative for each concept. Why did you select it?

DESIGN AS REFLECTION

On Tuesday, January 11 we’ll consider how design can be seen to be reflective practice.

REFLECTION ON PROCESS
Imagine a designer making a move, pausing to consider it, and then making another move. Schön labels this process reflection-in-action. In this process, how does Schön see the actors as engaging in a conversation with their materials? From his perspective, what important features make up the design situation? What type of the vocabulary does Schön develop to analyze a design move? Please read:


A REFLECTIVE ACTIVITY – MORE BLACK SQUARES
Create solutions to the four squares problem for the words increase and playful. Each solution should consist of 6 preliminary sketches and one sketch that you judge to be the most effective.

Now, consider your design work in terms of Schön’s paper and WRITE a 1-page reflection on how his analysis of the design process fits with what you did (or believe you did). You might address such questions as:

• How did the materials that you used influence your work?
• In what ways did your work talk back to you?
• What guided how you selected the most effective sketch?
• Was one of the problems more difficult than the other? If so, why might that be?

REFLECTION ON THING
Norman, on the other hand, begins with an artifact. He asks what features of artifacts lead to successful and unsuccessful interactions. What type of vocabulary does Norman develop to talk about the features of artifacts and how we interact with them? Pay attention to how Norman defines terms such as affordances, constraints, and natural mappings. Please read:


BRING A THING
Students A, B,… C: Please bring an artifact to class that you think is well designed.

Students X, Y,… Z: Please bring an artifact to class that you think is poorly designed.

WRITE A QUESTION AND DISCUSSION
WRITE a question you would be interested in discussing based on either Schön’s or Norman’s article. Then write a one-page reflection on your question. That is, discuss your own question. EMAIL your question and discussion in the BODY OF AN EMAIL MESSAGE to both of us (batya@u.washington.edu and dhendry@u.washington.edu) no later than 12 noon on Monday, January 10. We’ll use your questions to structure our class discussion on Tuesday. BRING your copy of the articles and notes with you to class.
OBSERVATION OF EXPERT DESIGNER

For today’s activity, we will observe a professional designer at work. He will be asked to develop a solution for the Home Energy Use problem (see below) and we will observe his design work as he thinks aloud. When observing, consider looking for events that fall under the following categories that Schön introduces in this week’s reading.

A. Dimensions of design process
   1. Design domains
   2. Implications
   3. Changes in stance

B. Types of experiment
   1. Exploratory – “action is undertaken only to see what follows” (p. 70)
   2. Move-testing experiments – “Any deliberate action undertaken with an end in mind” (p. 71)
   3. Hypothesis testing – “Hypothesis testing experiment succeeds when it effects an intended discrimination among competing hypotheses” (p. 71)

C. Other

Note: To do the reflective writing (DUE on January 18), you may want to pool your observations with other classmates to create a larger sample of data.

HOME ENERGY USE: PROBLEM STATEMENT
The problem is to invent an information system that promotes the efficient use of energy within the home. You should assume the following:
   1. The cost of building and deploying the system need not be considered
   2. Sensors of various types are available for monitoring energy use at various points in the home.

The solution should be a conceptual design for such a system.
DESIGN AS SOCIAL PROCESS

REFLECTING ON REFLECTIVE PRACTICE (DUE ON JANUARY 18)
During class we had an opportunity to observe an expert designer, XYZ as he engaged in a design process: To design an information system to promote energy efficiency in the home. Use Schön’s framework to characterize XYZ’s design process (1 paragraph). Then, compare your own design process from the previous week with the Black Squares to represent the concepts of “increasing” and “playful” with that of XYZ’s design process? (1 long paragraph)

SOCIAL CONTEXT, SOCIAL PROCESS, AND SOCIAL ACTORS
On Tuesday, January 18 we’ll consider how design can account for social context, social process, and social actors. One view, taken by Batya, proposes that information system designers first recognized the need to consider the users of the systems they designed (user-centered design), then that those users used those systems in a context-of-use (contextual and scenario-based design), and, finally, that not all users are the same (personas). In a complementary view, taken by Dave, designers have embraced methods that reduce the distance between the design team and the use setting and allow the team to see the setting in a common, shared way. The following set of readings introduces you to these perspectives and to some of the techniques that support the design process.

Please read the following four articles:


In addition, if you’re interested in organizational practice of design (and the challenges thereof) you may also wish to read:


WRITE a question you would be interested in discussing based on any of the first four articles. Then write a one-page reflection on your question. That is, discuss your own question. EMAIL your question and discussion in the BODY OF AN EMAIL MESSAGE to both of us (batya@u.washington.edu and dhendry@u.washington.edu) no later than 12 noon on Monday, January 17. We’ll use your questions to structure our class discussion on Tuesday. BRING your copy of the articles and notes with you to class.
SCENARIO AND PERSONA DESIGN ACTIVITY

REVISITING HOME ENERGY USE: PROBLEM STATEMENT
The problem is to invent an information system that promotes the efficient use of energy within the home. You should assume the following:

- The cost of building and deploying the system need not be considered
- Sensors of various types are available for monitoring energy use at various points in the home.

DESIGN APPROACH: SCENARIOS AND PERSONAS
This is the same design problem we observed XYZ address last week. Today, when you address this design problem, please do so through a combination of scenario and persona based design methods.
DESIGN AS DIALOG

NOTE: Because we will be attending Terry Winograd’s talk, class will meet only from 12:30 – 2:00.

REFLECTING ON THREE DESIGN PRACTICES (DUE ON JANUARY 25)
Reflect on the design practices you’ve seen applied to the energy problem: XYZ’s free-form tacit design method and your own application of scenario-based design and personas. Write a 1-page reflection in which you highlight the merits and unique perspectives of each. Also discuss any weaknesses that you find troubling.

DESIGN AS DIALOG
On Tuesday, January 25 we’ll explore the role of rationale and rationality in design. Moran and Carroll provide an overview of design rationale and argue for its place in information system design. In turn, Isenmann and Reuter show how hard it is to simultaneously construct a design rationale while engaging an information design problem. Winograd and Flores advocate a design process that gently works with the limitations of design rationale and rationality.

The following set of readings introduces you to these perspectives and to some of the techniques that support the design process.

Please read the following three articles:


WRITE a question you would be interested in discussing based on any of the articles. Then write a one-page reflection on your question. That is, discuss your own question. EMAIL your question and discussion in the BODY OF AN EMAIL MESSAGE to both of us (batya@u.washington.edu and dhendry@u.washington.edu ) no later than 12 noon on Monday, January 24. We’ll use your questions to structure our class discussion on Tuesday. BRING your copy of the articles and notes with you to class.

DISTINGUISHED LECTURE: JAN. 25 3:30 PM, TERRY WINograd
SPEAKER: Terry Winograd, Stanford University
TITLE: Designing for Fluent Interaction
DATE/TIME: Tuesday, January 25, 2005 at 3:30 PM
PLACE: EE-105

ABSTRACT:
As the world of computing moves away from individual interactive devices towards ubiquitous computer augmented environments, new issues of usability arise and others take on increased importance. In this talk I will present what we have learned from some experiences in computing "off the desktop" and discuss how we might extend theories that have been applied in HCI to cope with some of the new challenges and opportunities.
DESIGN AS DIALOG DESIGN ACTIVITY

PROBLEM STATEMENT: FIND MY MOMMA, PLEASE!
Scenario: Parents go out and about in the world. Their kids are often elsewhere – with friends, family members, day-care centers, school, after-school programs and the like. Emergencies happen. Parents need to be able to get in contact with their kids; kids need to be able to get in contact with their parents. But in our fast-moving world, often one doesn’t know how or where to reach the other. Design an information service – that is, an information system and supporting staff – to help ameliorate this problem. Your design solution should be expressed in the form of a flow chart. For example, if a kid (or caretaker for a kid) calls in looking for a way to reach a parent, the flow chart should specify the “conversation” that takes place to resolve the situation (e.g., Does the service give the parent’s contact information to the requester? Does the service notify the parent of the request for contact? Or??). Under what circumstances are different requests handled in different ways? What is the rationale behind these differences?

DESIGN APPROACH: DESIGN RATIONALE AND ONTOLOGICALLY ORIENTED DESIGN
There are two networks of “conversations” to attend to in the design process: one is the conversation you have amongst yourselves as a design team (e.g., as you construct your design rationale); the other is the network of conversations you are attempting to support in the problem space through your design (e.g., for the Find My Momma, Please! service to resolve how to connect parents, kids, and other stakeholders).

Step 1: We’ll provide you with general guidelines for recording your emergent design rationale as you engage in a design process for the above problem, including (a) what information will be collected (e.g., issues raised, solution options, pros and cons) and (b) how that information will be structured (e.g., categories of information, temporal sequences).

Step 2: For Find My Momma, Please! specify such concepts as:

- stakeholders;
- objects and properties of the objects;
- relationships between objects and stakeholders;
- requests, commitments, actions, and responses.

If you find it useful, you may draw rough sketches to help explore the domain. You might also find it helpful to recall the issues that came up in the dress shop example discussed by Winograd and Flores (p. 167 – 174). For purposes of this activity, more detailed specifications can be set aside (e.g., how the domain is represented on a web page).

Step 3: Drawing on your results from Step 2, develop a flow chart of interactions/conversations for Find My Momma, Please!

WHILE you design, please record your design rationale as you go.
GUIDELINES FOR RECORDING DESIGN RATIONALE

A design rationale “represents the reasons and reasoning processes behind the design and specification of artifacts” (Moran & Carroll, 1996, p. 2). Once recorded, a design rationale might help future stakeholders with such activities as:

1. Recalling critical information (e.g., assumptions, solution options, facts leading to decisions, trade-offs, and so on);
2. Explaining, reviewing, and justifying decisions made;

Please use a **rigorous process** for collecting the rationale of your design activity. Employing notations, such as IBIS and QOC, requires significant training and practice. To dodge that level of commitment but still follow a rigorous process, we suggest that you follow these three guidelines.

1. When making decisions, record the **assumptions** and/or **facts** that back your **decision**. Record the following:
   
   **Decision:** < a brief description>
   **Assumption:** <a brief description>
   **Fact:** <a brief description>

2. If you identify two or more **options** to a **design problem**, record the following:
   
   **Design Problem:** <name> and <description>
   **Option 1:** < name>
   + <a strength>
   - <a weakness>
   ...
   **Option 2:** < name>
   + <a strength>
   - <a weakness>
   ...

3. Organize this information **temporally**, for replaying the design process, and **thematically**, for examining the different kinds of issues addressed (e.g., user needs, dialog flow, exceptional conditions, etc.).
DESIGN AS HIERARCHICAL DECOMPOSITION

REFLECTING ON TERRY WINOGRAD’S TALK (DUE ON FEBRUARY 1)
Reflect on Terry Winograd’s talk. How does Terry’s current stance on design differ from or extend the views he espoused in Chapter 12 of Understanding Computers and Cognition in 1986? In what ways do you think the types of systems he is now designing – that is, ubiquitous ones – have influenced the direction of his current design process?

OR...

REFLECTING ON DESIGN RATIONALE (DUE ON FEBRUARY 1)
Reflect on the design rationale and ontologically oriented design practices you applied to the Find Me Momma, Please! design problem. Write a 2-page reflection in which you discuss these (or related) questions: How did the process of recording your design rationale influence your design process? What benefits and costs did you experience when applying an ontological orientation? And, how is ontologically oriented design compatible (or not) with other design methods we have already examined?

DESIGN AS HIERARCHICAL DECOMPOSITION
On Tuesday, February 1 we’ll explore how the design of information systems (artificial things) and our interaction with them (a behaving system) can be appreciated in terms of a hierarchy of components. Please read Simon (1996, Chapter 1) for the concepts that can be used to recognize the structure of systems, both human and artificial. Then, turn to Chapter 3 and study the claim that “Human beings, viewed as behaving systems, are quite simple” (p. 53). Ask yourself in what ways are we information processors?


Simon’s ideas play out in various approaches to information system design. One extremely influential approach is a class of formal models of human interaction, calls GOMS models. These models structure interaction in terms of Goals (and sub-goals), Operators, Methods, and Selection rules. One particular type of GOMS model is known as the keystroke-level model (KLM). The following article presents a KLM analysis of an extraordinary simple task and is representative of the highly detailed analysis that GOMS models demand. After you read this paper, consider this question: When would a GOMS-like analysis be appropriate and be informative to the designers of an information system?


The following paper follows the spirit of GOMS by focusing on how our activity at a computer unfolds as a sequence of goals and sub-goals that eventually leads to specific actions (e.g., keystrokes) but models this activity less formally. When reading this paper, please consider what is gained and lost by this less formal approach.


(Please see reverse …)
Finally, read this short report that discusses design issues for the Palm Pilot. Pay attention to how the GOMS model was used here.


WRITE a question you would be interested in discussing based on any of the articles. Then write a 1-page reflection on your question. EMAIL your question and discussion in the BODY OF AN EMAIL MESSAGE to both of us (batya@u.washington.edu and dhendry@u.washington.edu) no later than 12 noon on Monday, January 31. We’ll use your questions to structure our class discussion on Tuesday. BRING your copy of the articles and notes with you to class.
DESIGN AS HIERARCHICAL DECOMPOSITION ACTIVITY

PROBLEM STATEMENT: SWAPING FAST, FASTER, FASTEST ...
Consider an instructor’s goal of assigning students to project groups, subject to two conditions: 1) Each group must have a balance of skills; and 2) All groups are about equal in size. This task environment (Simon, 1996, p. 12) might be represented in Microsoft Word, the system, as follows:

<table>
<thead>
<tr>
<th>Group-1</th>
<th>Group-2</th>
<th>Group-3</th>
<th>…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jill</td>
<td>John</td>
<td>Jude</td>
<td></td>
</tr>
<tr>
<td>Tess</td>
<td>Bill</td>
<td>Mary</td>
<td></td>
</tr>
<tr>
<td>Jack</td>
<td>Fred</td>
<td>Bob</td>
<td></td>
</tr>
</tbody>
</table>

When forming and adjusting the groups, the instructor will often need to swap person-1 with person-2. This need to interchange items arises from the constraints of this particular task environment but swapping is surely a common task for many planning problems.

Microsoft Word provides various methods for completing the swap task. How should these methods be described? How should we assess these methods? What tools can we use to analyze this task in detail?

DESIGN APPROACH: TASK ANALYSIS AND GOMS

Step 1: Exploration with task analysis. Assuming that a person is using Microsoft Word, identify three different editing methods for swapping ‘green Tortoise’ and ‘brown Hare’ so that sentence (1) is transformed into (2):

1. One night the green Tortoise, happy as a clam, approached the brown Hare to talk …
2. One night the brown Hare, happy as a clam, approached the green Tortoise to talk …

For each method, describe the steps that must be performed. Your description should outline the general approach – a sketch of the interface for Word may help. Document your work on a transparency. We shall review these in class and select two methods for detailed analysis (see step 2).

Step 2: Modeling performance with the Keystroke-Level Model. For the TWO METHODS SELECTED IN CLASS, propose a sequence of operators for completing the tasks and compute time estimates. For this analysis, please use the following four operators, which are taken from Card, Moran & Newell (1983, p. 264).

<table>
<thead>
<tr>
<th>Operator</th>
<th>Time (sec)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>K – Press key or mouse button</td>
<td>0.2</td>
<td>A parameter determined by level of expertise, ranging from 0.08 – 1.2 for best to worst typist.</td>
</tr>
<tr>
<td>P – Point with a mouse</td>
<td>1.10</td>
<td>Varies with distance and size of target according to Fitts’s law</td>
</tr>
<tr>
<td>H – Home hands on keyboard or mouse</td>
<td>0.4</td>
<td>Time to move hands to either the keyboard or mouse.</td>
</tr>
<tr>
<td>M – Mentally prepare</td>
<td>1.35</td>
<td>Thinking needed prior to starting a physical operation.</td>
</tr>
</tbody>
</table>
While deciding when to include Hs, Ks, and Ps is relatively straightforward, deciding where to put the Ms is not (see, for example, Lane, Napier, Batsell & Naman, 1993). For this analysis, please use these two heuristics, which are taken from five heuristics proposed by Card, Moran & Newell (1983, p. 265):

Rule 0: Insert Ms in front of all Ks that are not part of a string sequence (e.g., a word being typed).

Rule 1: If an operator following an M is fully anticipated in an operator just previous to M, then delete M (e.g., pointing and clicking the mouse, P + M + K becomes P+K).

Here are two example analyses:

**Task:** Select the Save command in Word

<table>
<thead>
<tr>
<th>Description</th>
<th>Operator</th>
<th>Heuristic</th>
<th>Time (Seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Put hand on mouse</td>
<td>H</td>
<td></td>
<td>0.4</td>
</tr>
<tr>
<td>Mental preparation</td>
<td>M</td>
<td>Rule 0</td>
<td>1.35</td>
</tr>
<tr>
<td>Move cursor to Edit menu</td>
<td>P</td>
<td></td>
<td>1.10</td>
</tr>
<tr>
<td>Mental preparation</td>
<td>M</td>
<td>Rule 1</td>
<td>0.0</td>
</tr>
<tr>
<td>Click mouse</td>
<td>K</td>
<td></td>
<td>0.2</td>
</tr>
<tr>
<td>Move cursor to Save item</td>
<td>P</td>
<td>Rule 1</td>
<td>1.10</td>
</tr>
<tr>
<td>Mental preparation</td>
<td>M</td>
<td>Rule 1</td>
<td>0.0</td>
</tr>
<tr>
<td>Click mouse</td>
<td>K</td>
<td></td>
<td>0.2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td>1H + 1M + 2P + 2K</td>
</tr>
</tbody>
</table>

**Task:** Type the word ‘Tortoise’

<table>
<thead>
<tr>
<th>Description</th>
<th>Operator</th>
<th>Heuristic</th>
<th>Time (Seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Put hand on mouse</td>
<td>H</td>
<td></td>
<td>0.4</td>
</tr>
<tr>
<td>Mental preparation</td>
<td>M</td>
<td>Rule 0</td>
<td>1.35</td>
</tr>
<tr>
<td>Move cursor to insertion point</td>
<td>P</td>
<td></td>
<td>1.10</td>
</tr>
<tr>
<td>Mental preparation</td>
<td>M</td>
<td>Rule 1</td>
<td>0.0</td>
</tr>
<tr>
<td>Click mouse</td>
<td>K</td>
<td></td>
<td>0.2</td>
</tr>
<tr>
<td>Put hand on keyboard</td>
<td>H</td>
<td></td>
<td>0.4</td>
</tr>
<tr>
<td>Mental preparation</td>
<td>M</td>
<td>Rule 0</td>
<td>0.0</td>
</tr>
<tr>
<td>Type shift key + ‘t’</td>
<td>2K</td>
<td></td>
<td>0.4</td>
</tr>
<tr>
<td>Type ‘ortoise’</td>
<td>7K</td>
<td></td>
<td>1.4</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td>2H + 1M + 1P + 10K</td>
</tr>
</tbody>
</table>

**Step 3: Invention.** Now, reflect upon the keystroke-level analysis of the two methods for swapping items. Does this analysis suggest a more efficient method for swapping items? Describe the method and compute a time estimate for it. What considerations other than time are important for assessing the new method?
**Step 4: Validation.** In this step we will conduct a simple experiment and collect performance data for the two methods in an attempt to validate the above keystroke-level analysis. A ‘response sheet’, contained in a Word document, will be e-mailed to the class shortly after class on Tuesday. Using the response sheet, you should follow this general procedure:

**Set-up**
1. Set the screen resolution of your computer to 1024 X 768 pixels.
2. Set the mouse properties to default values (e.g., double click speed, pointer speed, etc.).
3. Close all applications except Word and Internet Explorer.
4. Set the view resolution in Word to 100% and remove all unnecessary tool bars.

**Practice**
1. Explain Method-A and demonstrate it to the participant. (Note: It is important that the participant complete the task exactly as specified in the response sheet.)
2. Once the participant understands Method-A, scroll to Practice #1 on the response sheet and position the cursor and mouse pointer before the heading “Practice #1”.
3. Ask the participant to place both hands on the keyboard.
4. Prompt the participant to begin and start timing.
5. Stop timing when you see that the participant has finished the task.
6. Note the time to the NEAREST TENTH OF A SECOND, whether the edit was correctly performed or not, and whether the participant made an error during the completion of the task.
7. If Method-A was not followed correctly, explain the deviation and demonstrate the method again.
8. Ask your participant to browse some online news for at least one minute.
9. Repeat the practice until the participant completes three practice tasks correctly.

**Trials – Method-A**
1. Scroll to Trial #1 on the response sheet and position the cursor and mouse pointer before the heading “Trial #1”.
2. Ask the participant to place both hands on the keyboard.
3. Prompt the participant to begin and start timing.
4. Stop timing when you see that the participant has finished the task.
5. Note the time to the NEAREST TENTH OF A SECOND, whether the edit was correctly performed (the correct outcome using the correct method), and whether the participant made an error during the completion of the task.
6. Ask your participant to browse some online news for at least one minute.
7. Repeat until all five trials are completed.

**Trials – Method-B**
1. Follow the practice procedure as outlined above.
2. Then, collect data in the identical fashion as Method-A.

Note: We will counterbalance the conditions so that half the class will collect data for Method-A then Method-B and half the class will collect data for Method-B then Method-A.
You should e-mail your data to dhendry@u.washington.edu in the following format:

<table>
<thead>
<tr>
<th>Subject initials</th>
<th>Order</th>
<th>Method</th>
<th>Trial</th>
<th>Time</th>
<th>Correct</th>
<th># Errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your initials</td>
<td>AB or BA</td>
<td>A or B</td>
<td>1-5</td>
<td>xx.xx</td>
<td>Y or N</td>
<td>#</td>
</tr>
</tbody>
</table>

Your file should contain 11 records with tabs between each column

<table>
<thead>
<tr>
<th>Subject</th>
<th>Order</th>
<th>Method</th>
<th>Trial</th>
<th>Time</th>
<th>Correct</th>
<th># Errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGH1</td>
<td>AB</td>
<td>A</td>
<td>1</td>
<td>12.3</td>
<td>Y</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>9.8</td>
<td>Y</td>
<td>1</td>
</tr>
<tr>
<td>DGH1</td>
<td>BA</td>
<td>B</td>
<td>1</td>
<td>15.8</td>
<td>Y</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>8.1</td>
<td>Y</td>
<td>0</td>
</tr>
</tbody>
</table>

Notes:
1. Please format the data in a text file, named <your_initials>.txt
2. Please include the column headings on the first row only.
3. Please insert SINGLE TABs between each data field on all rows.
4. Your file should include 11 rows: 1 header row and 5 rows for method-A and five rows for method-B (or 5 rows for method-B and then 5 rows for method-A) Please do not include the practice data.
5. Please note if the final result is correct (Y or N) and how many ‘errors’ the participant made while completing the task (an integer #).

Dave will combine the individual data files, producing one aggregate data set which will then be e-mailed to the class.
Explain Method A

drag-n-drop
Please use the following procedure for drag-n-drop:
1. Position the curse in front of ‘Practice #1’ and place hands on the keyboard;
2. Move the cursor to the beginning of ‘green’;
3. Select ‘green Tortoise’ by clicking and dragging the mouse until ‘green Tortoise’ has been selected;
4. Drag the selection to the appropriate place, just before ‘brown Hare’;
5. Release the mouse;
6. Repeat step 1 to 4 for ‘brown Hare’.

Use Method A
Swap the phrases ‘green Tortoise’ and ‘brown Hare’

<<NOTE to Experimenter: At the top of separate pages in Word, please repeat this practice template for X=1..3 – remove this note>>

Practice #X

One night the green Tortoise, happy as a clam, approached the brown Hare to talk
...

(Please read some news for at least 1 minute http://news.google.com/)

Use Method A
Swap the phrases ‘green Tortoise’ and ‘brown Hare’

<<NOTE to Experimenter: At the top of separate pages in Word, please repeat this trial template for X=1..5 – remove this note>>

Trial #X

One night the green Tortoise, happy as a clam, approached the brown Hare to talk
...

(Please read some news for at least 1 minute http://news.google.com/)
Explain Method B

keyboard-only
Please use the following procedure for keyboard-only:

1. Position the cursor in front of ‘Practice #1’ and place hands on the keyboard;
2. Use the ‘arrow’ keys move the cursor to ‘green Tortoise’;
3. Use the ‘Delete’ key to delete the phrase ‘green Tortoise’;
4. Type the phrase ‘brown Hare’;
5. Use the ‘arrow’ keys to move the cursor to ‘brown Hare’;
6. Use the ‘Delete’ key to delete the phrase ‘brown Hare’;
7. Type the phrase ‘green Tortoise’.

Use Method B
Swap the phrases ‘green Tortoise’ and ‘brown Hare’

<<NOTE to Experimenter: At the top of separate pages in Word, please repeat this practice template for X=1..3– remove this note>>

Practice #x

One night the green Tortoise, happy as a clam, approached the brown Hare to talk...

(Please read some news for at least 1 minute http://news.google.com/)

Use Method B
Swap the phrases ‘green Tortoise’ and ‘brown Hare’

<<NOTE to Experimenter: At the top of separate pages in Word, please repeat this trial template for X=1..5– remove this note>>

Trial #1

One night the green Tortoise, happy as a clam, approached the brown Hare to talk...

(Please read some news for at least 1 minute http://news.google.com/)
DESIGN AS COMPOSITION AND PATTERN MAKING

DATA COLLECTION AND REFLECTION ON TASK ANALYSIS AND GOMS
Based on the previous class work, we’ll pull together a handout that summarizes two methods for performing the swap task. This handout will be emailed to everyone in the class sometime on Tuesday.

Part 1 (Due Friday, February 4 by 10:30 AM): This should take 45 – 60 minutes. Find a friendly compatriot. Follow the directions as specified on the handout. Have your compatriot use each of the methods to transform the designated text in the designated manner. Please follow the procedure outlined in the handout very carefully. Email the results of your user study to us no later than 10:30 AM on Friday morning, February 4.

Part 2: (By Friday afternoon, February 4. Nothing for you to do here…). We’ll combine all the data and email it to you all.

Part 3: (Due in class on Tuesday, February 8). Analyze the data from all of the participants (perhaps by graphing it). Write a 1-2 page reflection in which you (a) consider the results of your analysis in terms of the class predictions, (b) reflect on your process, and (c) discuss what types of information design problems and when in the information design process a task analysis and GOMS-like approach could reveal critically important information.

DESIGN AS COMPOSITION AND PATTERN MAKING

Each pattern describes a problem which occurs over and over again in our environment, and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over, without ever doing it the same way twice. -- Christopher Alexander

On Tuesday, February 8 we’ll explore the use of patterns in the design process and the activity of building up design solutions from successive components. Please read the following:


Invent an information design problem that you think would be interesting to approach from a composition/pattern language perspective a la Christopher Alexander (as characterized by Tom Erickson) or Molly Bang. Write a description of your information design problem and then a 1-paragraph rationale for why you think it would be interesting to approach this problem in this way. Email your information design problem and rationale for the approach in the BODY OF AN EMAIL MESSAGE to both of us (batya@u.washington.edu and dhendry@u.washington.edu) no later than 12 noon on Monday, February 7. We’ll use your information design problems to structure our class design activity on Tuesday. Bring your copy of the articles and notes with you to class.
DESIGN AS COMPOSITION AND PATTERN MAKING

NOTE: Please form your teams so that at least one team member has some programming experience.

PROBLEM STATEMENT: PARK CONSTRUCTION KIT
Your challenge (should you choose to accept it), is to develop (a) a paper prototype of a visual programming language to support the design of a public park and (b) one or two “Alexander-like” patterns that link human activity with an aspect of the park design. (Hint: No, we don’t expect you to complete this activity in 50 minutes…)

DESIGN APPROACH: COMPOSITION AND HIERARCHICAL INTEGRATION
We’ll approach this problem as follows:

Step 1: Develop the “primitives” of your visual language. These will be the basic elements that you will use to build up all other elements in your language (e.g., rose bush, brick). For each primitive, your language will need to specify how that element (a) is affected by the elements next to it or in the nearby environment; (b) changes over time – both the type of change and the duration (e.g., rose bush blooms every spring; bricks gather moss at 6 month intervals); and (c) connects to or can be combined with other elements (e.g., rose bush connects to the side of other rose bushes; brick interlocks with other bricks). PLEASE invent no more than 10 primitives.

Step 2: Develop “composites” from the primitives. That is, you want to combine instances of your primitives into larger meaningful units (e.g., an arrangement of seven rose bushes into a composite called a “rose bed”; an arrangement of bricks called a “path length”).

Step 3: Develop a park or garden by aesthetically combining primitives and composites (e.g., a rose-lined path constructed from rose beds placed alongside of a series of brick path lengths). This is where the Alexander-like patterns are likely to come in (e.g., a rose-lined brick path to invite park visitors to stroll through the park).
PATTERN TEMPLATE

TITLE:

CONTEXT/RATIONALE:

THEREFORE:

Other patterns which may overlap, support, or interact with this pattern are:
DESIGN AS INVENTION

REFLECTION ON PARK CONSTRUCTION KIT
Write a 1-2 page reflection on the process of designing your park construction kit. Think about why your team chose the primitives they did. In hindsight were these good decisions? Why or why not? Ditto for the composites you decided to build. How did the composites you developed influence the Alexander-like patterns you developed and the park you eventually constructed?

Please attach a photocopy of your primitives, composites, park design, and pattern(s) to your reflection.

DESIGN AS INVENTION
On Tuesday, February 15 we’ll explore design as the process of invention. XYZ will be joining us for an encore appearance! Please read the following:

Petroski, H. (1996). Invention by design: How engineers get from thought to thing. Cambridge MA: Harvard University Press. (Chapters 1 [intro], pp. 1-7; Chapter 3 [pencil], pp. 43- 65; Chapter 7 [airplanes & computers], pp. 120-140.)

WRITE a question about how design is practiced or creativity nurtured, either in general or at Microsoft. (We’ll let XYZ answer. You do not need to write a response!) Please EMAIL your question in the BODY OF AN EMAIL MESSAGE to XYZ@xyz, batva@u.washington.edu and dhendry@u.washington.edu no later than 12 noon on Monday, February 14. We’ll use your questions to structure our class discussion on Tuesday. BRING your copy of the articles and notes with you to class.

DESIGN EXPO – PLEASE SEND US YOUR IDEAS!
We’ll end the quarter with a Design Expo. For the Expo, you’ll have two weeks to work in a small team to design a solution to an information design problem. You may use any combination of design approaches that you think appropriate. At this point, we’d like to get your ideas for the Expo’s information design problem! The Expo problem should be engaging, fun, small enough to make good progress on in two weeks, and involve an information system in some form. You might also want to say a word or two about why you think it’s an interesting problem for us to spend time with. Please email us your ideas before class on Tuesday Feb. 15.

We’ll work your ideas and see what we come up with. The Design Expo problem will be revealed the following week in class on Feb. 22. The Design Expo itself is scheduled for Tuesday, March 8.
DESIGN AS INVENTION

The best way to predict the future is to invent it. — Alan Kay in 1971

http://www.smalltalk.org/alankay.html

PROBLEM STATEMENT: THE NEXT GENERATION TIME PIECE
From sun dials to grandfather clocks to mantel clocks to pocket watches to wrist watches, time pieces have evolved – greater mobility, smaller size, lesser weight, greater granularity, greater accuracy. Now, the network is with us. With this design activity, your challenge is to envision the next generation time piece.

Constraints: Your time piece must be wearable. You must create a physical actual size mock-up of the artifact. And at a minimum, it must report the time.

DESIGN APPROACH: DESIGNER'S CHOICE
Designer’s choice – that says it all!
DESIGN AS INVENTION: SOLUTIONS TO THE NEXT GENERATION TIME PIECE

THE DISCREET WATCH (TEAM #1)
The watch that lets busy people be polite. The discreet watch is designed for professionals who need to be discrete and polite while staying on top of their time. The detachable watch face is easily removed from the elegant watch band and clipped or placed in an easily visible location. Features:
- removable watch face with convenient clip
- elegant wrist band
- automatic synchronization to local network time sources
- countdown timer

THE HAPTIC WATCH (TEAM #2)
"Feel the time when you can't see the watch."

The Haptic Watch is a time piece designed to permit users to determine the time of day (down to minutes and seconds) without having to look at their watches. For all situations where reading a watch is not an option, the Haptic Watch provides an elegant and new solution where you can easily tell the time without a glance. Our technology permits users to tell the time by touch, the special interlocking and moving time beads rotate around your wrist in a distinguishable and clear fashion. You can tell time momentarily by feeling the time band with your opposite hand or even with the watch hand itself. Designed primarily for the visually impaired. Our first customer. Additional Features include:
- Wireless connection to your computer, permitting configurations/updates
- Haptic alerts, have an irregular bead softly flip for a gentle reminder or set the wrist band on vibrate for critical timers
- Wireless communication with properly equipped traffic signal systems to give the visually impaired a tactile sense of the urban jungle

RELATIVITY: TIME IS RELATIVE (TEAM #3)
We designed a watch for people who need to know how much time remains until an important event occurs. This watch builds on the idea of a charm bracelet and would have one or more "charms" that can be easily set to count time the minutes, hours, days, or weeks until an event. Many different charms would be made available to allow people to personalize the watch and select charms that are meaningful to them. These charms would act as mnemonics to which people assign their own meaning. For example, a student taking a biology class may use a leaf relativity watch charm to remind her of upcoming biology deadlines.

The idea sprang out of our own need to manage multiple deadlines in which the work involved often expands to fit any deadline given. While we first designed it with graduate student schedules in mind, we quickly revised the idea to include all students (middle-school through college) and other busy people managing multiple deadlines. During class discussion, we realized that the Relativity watch could also be useful for people taking multiple medications or engaging in time sensitive medical treatments.
TIME TILT (TEAM #4)
Features:
- A small digital time piece that can be worn as a necklace, on a chain, or on a tie-- depending on your style.
- In addition to displaying the time, it uses wireless network technology to automatically sync with the user's calendar when she sits in front of her computer.
- Alarm will alert the user of an upcoming meeting or event.
- No buttons! Calendar is activated by slight pressure from the fingers on either side of the device. (Ergonomic design indicates where the fingers should go). Innovative interface technology allows the user to browse calendar events by tilting the device left or right to scroll forward or back from day to day.
- The rear of the device has a tiny video projector that allow the user to project a bigger interface on any flat surface (convenient for looking at more than one day at a time on the calendar!).
- Removable face plates let you personalize the Time Tilt with your favorite color or design
DESIGN AS PARTICIPATION

REFLECTION ON INVENTION
Think about it – no written reflection this week!

DESIGN AS PARTICIPATION
On Tuesday, February 22 we’ll explore design as participation. Please read the following:


WRITE a question you would be interested in discussing based on any of the first four articles. Then write a one-page reflection on your question. That is, discuss your own question. EMAIL your question and discussion in the BODY OF AN EMAIL MESSAGE to both of us (batya@u.washington.edu and dhendry@u.washington.edu ) no later than 12 noon on Monday, February 21. We’ll use your questions to structure our class discussion on Tuesday. BRING your copy of the articles and notes with you to class.
DESIGN AS PARTICIPATION

PROBLEM STATEMENT: ISCHOOL ADMISSIONS PROCESS
The purpose of the iSchool admissions process is to review student applications and to select students for one of five graduate programs offered by the iSchool. Here, we shall consider only the Ph.D. program.

The Ph.D. Admissions Committee, consisting of the program chair, faculty representatives, and a student representative, is responsible for reviewing applications and selecting students. A program coordinator from Student & Academic Services manages this process, helping to ensure that information is exchanged between all stakeholders and that the process is followed in a timely fashion. The major stakeholders are:

- The applicant who completes the application (international and national applicants are treated differently)
- The recommenders who write letters of reference on behalf of the student
- The faculty members who review applications, attend applicant interviews, participate in informal events with applicants, give feedback to the admissions committee, and so on
- The program chair who is ultimately responsible for the students admitted into the program
- The staff of Student & Academic Services who respond to student questions
- The program coordinator who plans student visits and interviews, organizes meetings of the Admissions Committee, and so on
- The graduate school.

Various information systems support this process, including:

- Electronic mail
- Group calendar
- Paper-based information packets and forms
- Informational websites, controlled by the iSchool and Graduate school
- World-Wide-Web Application for Graduate Admission – A website used by students to submit and revise applications
- iSchool Graduate Application Administrator – A website used by members of the Admissions Committee to review applications

The aim of this activity is to explore how a future workshop can be used to generate new visions for the admissions process.

(Please see reverse …)
DESIGN APPROACH: FUTURE WORKSHOP

As described by Kensing & Madsen (1991), future workshops consist of three phases:

**Critique** – Identifying problems with the current system

**Fantasy** – Envisioning solutions through creative activities and ranking solutions

**Implementation** – Developing an implementation plan (tasks, responsibilities, dates)

In this activity, we shall focus on the first two phases only – critique and fantasy. The activity will be structured as followed:

**Preparation (10 min)**
1) Post exhibits on the wall (e.g., screen shots, rating forms, example e-mails)
2) Review design activity
3) Assign meta roles:
   a. A person to watch the time
   b. A person to note deviation from, and adherence to, good practice. E.g.,
      i. Holding floor for more than 30 sec
      ii. Criticize or defend ideas

**Introduction (20 min)**
4) Introduce the system
5) Guest stakeholders introduce their roles to the class
6) Generate list of metaphors for inspiring creativity

**Critique (40 min)**
7) Brainstorm (20 min)
   a. Identify current problems (follow brainstorming techniques)
   b. Write down problems on PostIts and post on whiteboard (differ organizing work)

8) Consolidate (15 min)
   a. Three volunteers organize problems in categories

**Fantasy (40 min)**
9) Work fantasy phase (30 min)
   a. Map problems to opportunities
   b. Sketch vision of a future solution

10) Consolidate and rate (10 min)
    a. Using criteria to rate each solution
    b. Select two most promising solutions

*No groups today – we shall work together as a class!*
## CRITERIA RATING SHEET

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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### Criteria

- **Internal Impact**: The impact on internal stakeholders (1 – 5; high – low quality impact)
- **External Impact**: The impact on external stakeholders (1 – 5; high – low quality impact)
- **Implem. Difficulty**: How easily is the solution to implement (1 – 5; easy – hard)
- **Cost**: How expensive will the solution be (1 – 5; inexpensive – costly)
- **Tech. Feasibility**: How technically feasible is the solution (1 – 5; high – low)
DESIGN FOR HUMAN VALUES

REFLECTION ON PARTICIPATION
Think about it – no written reflection this week!

DESIGN AS HUMAN VALUES
On Tuesday, March 1 we’ll explore the place of human values in design. Please read the following:


WRITE a question you would be interested in discussing. Then write a one-page reflection on your question. That is, discuss your own question. EMAIL your question and discussion in the BODY OF AN EMAIL MESSAGE to both of us (batya@u.washington.edu and dhendry@u.washington.edu) no later than 12 noon on Monday, February 28. We’ll use your questions to structure our class discussion on Tuesday. BRING your copy of the articles and notes with you to class.
DESIGN FOR HUMAN VALUES

PROBLEM STATEMENT: INFORMATION TOOLS FOR SOCIAL CHANGE
In their recent information system design work, Hendry et al (in press) “[address] a profound human and social goal: To help people to reduce behaviors that put them at risk of becoming infected with sexually transmitted infections (STIs), including HIV.” To do so, they took standard paper-prototyping techniques from user-centered design into the streets to help engage participants and shape the design of a Tablet PC application for learning about sexual health. In the process, the design team and participants engaged the values of enfranchisement and empowerment.

Dave views this work as one small step toward addressing values in the design process. Thus, we are poised to ask: What might Hendry et al.’s design approach have looked like if they had addressed the same set of concerns following the design stance articulated by Illich in Chapter 2 “Convivial Reconstruction” of Tools for Conviviality? Alternatively, what if Hendry et al. had followed a Value Sensitive Design approach?

Your challenge is to think through Hendry et al’s design problem from the perspective of either Illich’s “Convivial Reconstruction” or Value Sensitive Design.

Constraints: For this design activity, we suggest you aim for the forests rather than the trees: That is, step back and think of sketching a design program or overarching approach to the larger problem of providing health information for “groups that are often disenfranchised, such as young men and women of color or of low economic standing”.

DESIGN APPROACH: “CONVIVIAL RECONSTRUCTION” OR VALUE SENSITIVE DESIGN
Choose one of these two approaches: Illich’s Convivial Reconstruction or Value Sensitive Design. In 50 minutes, you won’t have time to consider both!
THE DESIGN EXPO!

THE CONCEPT OF A DESIGN EXPO!
The idea for the Design Expo is to allow you more than 50-minutes to work on a single information design problem (imagine that!) as well as to give you the opportunity to think about what design approaches to apply, when to apply them, and how to integrate them.

PARAMETERS
- We’ll work in small teams (3 – 4 people) of your own choosing.
- Everyone will work on the same information design problem.
- The design problem will be passed out on Tuesday, Feb. 22. You will have until the beginning of class on Tuesday, March 8 to complete your design.
- We do not expect you to completely solve the information design problem. To bound your efforts, we ask that each team member spend no more than 10 hours on the actual design (so a team of four people would have 40-person hours to devote to the design). In addition, we ask that each team member spend no more than 5 hours on preparing the reflection and class presentation (see the next bullet item).
- The actual Design Expo: During class on March 8, each team will have 20 minutes to present their design and design approaches as well as to reflect on their design experiences, followed by 10 minutes of discussion by the class. We may have a guest designer or two with us to provide additional perspectives.

PROBLEM STATEMENT: MANAGE MY MEDS (CONTRIBUTED BY STUDENT X)
Complicated drug regimens for treatment or management (HIV is a good example) are important to follow, but can be difficult to keep track of. People need a good way to keep track of and be reminded when to take medications and which medications to take. They also need to be able to take this information and their medication with them throughout their day. Your design challenge is to create an information artifact to help people remember to take their medications when they need to be taken. This device could also keep track of which medications have been taken.

Why it’s interesting: First, I (Meredith) think this is an interesting design challenge because it is a problem that is relevant and important for real people. Finding good ways to help people adhere to drug regimens can be helpful in managing any number of illnesses. I also think this is an interesting problem because it can be approached from many perspectives. This is a reminder system so there are issues of how to design a helpful reminder system that doesn’t get annoying. There are issues of how to make a system that can be used in multiple locations, and there are also issues of how people will want to use this tracking/reminder capability. Besides these there are also issues of privacy, security, and control of the information, as well as how to convey these to the user.

DESIGN APPROACH: DESIGNER’S CHOICE
Designer’s choice – that says it all! We encourage you to use as many of the design approaches we’ve explored this quarter as you deem appropriate and for which ever aspects of the design process you find beneficial. That said your choice and integration of design approaches should be reasonable and reflective.

DESIGN REFLECTION (DUE IN CLASS ON MARCH 8)
As a team, write a 4 – 5 page reflection on your design process. In your reflection, please address the following (and other questions as you deem appropriate or interesting): What design approaches did you decide to use? Why did you choose these? How did you integrate the approaches? What worked well? What do you wish you had done differently? In hindsight, how well suited were these design approaches for the information design challenge you faced? Note: Only one design reflection should be written for each team.
X:
I. One potential design idea: CVS stands for concurrent versioning system. It is a software tool that permits programmers to work on a code that is constantly updated. Design a user-interface or system that is accessible to novice and expert users alike to permit contributors to share code.

II. Another potential idea: Photo sharing. (a narrow situation).
Situation: 15 people are at a birthday dinner. When the cake emerges, 10 cameras (8 of them digital) are handed to Bill. Bill takes pictures with the film cameras and only takes a picture with Amy's digital camera (the one with the largest number of megapixels). Amy promises to email the picture to everyone, but never does.

Option A: Redesigning the camera itself
Option B: Designing a photo sharing service
Option C: Designing a good or fast way to share email addresses

III. "In vivos" Bus Information System. Problem: Buses do not arrive on time. Specific Situation: A potential bus-rider standing at a bus-stop has to decide whether or not to wait for the bus to arrive.

Option 1: Given an Information Kiosk at bus stops. What is a good UI design?
Option 2: Design a handheld information system or bus hailing tool. (Suppose that short ranged location awareness is a given, i.e. "the 48 is .5 block away and moving away")
Option 3: How to create a system that can inform the design and modification of bus routes quarter or quarter.

Y:
Design an information system for supporting public dialog regarding priorities for improving the central Puget Sound regional transportation system.

I think this is a fun and interesting design problem for a number of reasons, of which I’ll describe three. First, because the system is intended to support the participation of any citizen in the central Puget Sound region who wishes to contribute, the range of possible users (and perspectives) is broad. Second, designers will have to consider how to balance a number of potentially competing values, such as the need for enabling freedom of expression and the need for facilitating a constructive and fruitful dialog between citizens who may initially be in political opposition. Third, designers can consider a variety of ways in which relevant information (such as details about transportation system problems, the predicted impacts of proposed solutions, financial constraints, etc.) may be made available to participants during the dialog in order to support informed deliberation.

While this design problem is inspired by a broader research project currently underway at UW, to date there has been very little focus on the specifics of this information system design. Therefore, there are no constraints on the ways in which the designers can choose to approach the problem. None-the-less, there is a chance that good ideas will eventually be incorporated into the fully-developed information system (giving credit where credit is due, of course!). On the other hand, there is no reason why the focus of this system needs to be on regional transportation improvement—any planning or public policy issue that impacts the daily lives of residents in a region would be appropriate. To make the design project more manageable, designers can choose to focus only on a small aspect of this design problem if they wish. Finally, this design problem is broad enough to provide interesting opportunities for the use of a variety of different design perspectives or approaches—such as personas, scenario-based design, design as reflection, participatory design, or value-sensitive design.
Z:

Amazon.com has a wonderful recommendation system. It is so good at determining which books I will like that it recommends many books I already own.

Amazon.com does have one way to tell it what you already own: let it make a bunch of recommendations, then check the little box that says "I own it." With my family's 500+ book library, this isn't very efficient (though at least Amazon is starting to recommend *some* books I haven't read). Design an interface that will make it easier for users with a large number of books to enter them, if they choose to do so.

Just a pet peeve. This is a relatively small, self-contained problem that is part of a larger system. I can see many ways of solving it, with tradeoffs between at least effort and expense.