

COURSE GUIDE
FOR
MMIS 680 HUMAN-COMPUTER INTERACTION

ONLINE FORMAT
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Getting Started

Welcome to the HCI course! This document provides specific instructions on what you need to do to complete the course. As you know, much of your work will be completed in a computer-based format. In this dynamic environment, you will study human-computer interaction by researching and completing assignments and by discussing issues with your professor and fellow students.

Getting organized and maintaining organization is important for successful completion of this course. Please read this document carefully and login regularly to check for special announcements.

Online Access to Course Materials and Activities:

Most course activity is managed through WebCT, except for email communication. The professor has developed a HCI online study area to provide you with the necessary resources to begin your study in this area. (The URL is: <http://scis.nova.edu/nova/hci/top.html>). The HCI website was designed for the purpose of centralizing information and managing course material in addition to what is posted in WebCT. WebCT is being used to post the most essential course materials (except required articles selected by the professor) such as the course syllabus and course requirements (contained in this course guide). WebCT will be used for our online asynchronous discussions, course announcements, and for assignment submissions. With WebCT and the HCI website combined, consider this online study area to be the “classroom” where you go to learn about and discuss HCI. Please note: WebCT email WILL NOT be used for course correspondence. Students are required to use their SCIS email accounts through standard email software to communicate with the professor outside of WebCT. Also, no email attachments of assignment submissions will be accepted, unless preapproved by the professor.

From the HCI website, you should check many links out regularly to stay current with the course.

- Visit the “Learning Connections” link. That will lead you to your course section, lecture notes and other things to empower your learning experience.
- Visit the “HCI Web Exploration” link. There are several “HCI” related links that will help you with your research.

Information Requested Early!

- Prepare a short "bio" about yourself. You will be able to post this information in a thread the professor establishes in the first week of the course in the WebCT asynchronous forums. (I like to call this Student Forums in the generic sense.) Do not email the bio to the professor. Wait until the thread is established in the Student Forums. In your bio, indicate your full name, your SCIS account username, what term this is for you, and anything else of interest to your fellow students.

About Student Forums -- Class Participation

We will be using WebCT's asynchronous discussions area as an environment in which students and the professor discuss HCI issues throughout the term. I like to refer to this environment as "Student Forums". Once you have access to the course in WebCT, you will be given topic areas pertinent to HCI. The professor will be posting topics throughout the term.

There will be several "threads" or mini-conference themes relating to Human-Computer Interaction (HCI). Specific topics will be posted throughout the term. Each student is required to participate in the discussions. Points will be given on the basis of steady effort and meaningful contribution to the discussions throughout the term. Several short responses are encouraged, but they should be responses that reflect thought and promote further interest in the topic, not just responses for the sake of meeting the participation requirement.

You may be the first student to contribute to a theme! Don't be shy. Special recognition will be given to students who really contribute to the conference activity -- those who contribute first to a theme and those who participate regularly.

Please DO NOT establish your own threads or themes. If there is a particular topic you would like to discuss as a theme, send Dr. Dringus a request via email. From there, the professor will post all conference threads or themes. Essentially the professor is the gatekeeper of the forums. As gatekeeper, I reserve the right to delete any student postings that are considered inappropriate or irrelevant to the discussions. Scholarly discussions are expected for this class discussion activity.

A couple of "starter" topics will be posted early in the term so that you can practice using the asynchronous discussions area in WebCT. The first formal discussion topic will be posted around the 2nd or 3rd week of the term. Note that our discussions will be strictly asynchronous: enabling students to participate AT ANY TIME in the discussions. Participation on a specific evening at a specific time is not required by this professor. However, to keep the discussions lively and active, students should plan as part of the weekly activity, to check out and perhaps contribute to the on-going themes. Steady participation throughout the term is required to earn full class participation points. The process works best when everyone participates throughout the term. This is an opportunity for students to get to know one another during the term!

DETAILS ON COURSE ASSIGNMENTS

ASSIGNMENTS:

These assignments require outside literature research and activity beyond required texts and readings:

Assignment #1: Due on or before Sunday, May 6, 2007

Software or interface evaluations: You will evaluate the user interface of your choice using the principles of good design and usability attributes presented in the texts. You will prepare a 8 to 10 page paper that discusses the good and poor design aspects of the interface. Discuss your reactions to the interface based on the principles of good design and make recommendations for improving the product. Instructions for completing this assignment are presented in this course guide.

Assignment #2 -- Due on or before Sunday, June 17, 2007

Usability evaluations -- Conduct and report a usability evaluation using a minimum of three participants. If the evaluation is planned and executed effectively, the results of the usability evaluation can lead to valuable recommendations for improving the quality of the product under evaluation. You will prepare a detailed report that will contain a presentation and discussion of the entire usability evaluation process (from conceptualization to reporting results and making recommendations). This exercise will give you direct experience of assessing user interface design by performing systematic observation of user participants. Instructions for completing this assignment are presented in this course guide. The usability evaluation can be based on previous investigations of products or interfaces evaluated from Assignment #1.

INSTRUCTIONS FOR COMPLETING ASSIGNMENT #1:

After becoming familiar with user interface design strategies, the student will evaluate a user interface using the principles of good design and usability presented in the texts. The student may evaluate any software or hardware interface (e.g., a Web site, a word processor or spreadsheet software, touch screen interface, PDA). The interface selected should be complex enough to support detailed analysis of the design and usability of the interface.

The evaluation will involve the preparation of a discussion paper (8 to ten pages) that discusses the good and poor design and usability aspects of the interface. The usability principles and attributes discussed in the texts will be used as a basis for the student's subjective evaluation of the interface. The discussion paper is a critique, a scholarly synthesis of the HCI principles, strategies, and guidelines that pertain to the design and usability of user interfaces. The paper should contain a discussion of a relevant usability principle and some sort of rating as to the extent the principle was met or not. Additionally, you should discuss your recommendations for improving the design and usability of the user interface. Your discussions and recommendations must be substantiated by the literature. Even though this is a subjective evaluation (you are the evaluator), write the paper in third person narrative and rely on the literature to substantiate and synthesize your critique.

Keep the choice manageable! Many programs or interfaces are quite large, so you may have to decide to limit your evaluation to certain aspects of the program, e.g., the help system, some overall functions and features, or special options for expert or novice users. The evaluation should be based on a goal or a set of metrics, such as evaluating for ease of use, ease of learning, consistency, etc.

A note about your recommendations and substantiation of literature – you are analyzing an interface of your choice. Here you have an opportunity to integrate into your paper pertinent information that you have gained from the required readings and from your own literature search. The literature integration will serve as a conceptual bridge between what you believe should be improved with the interface and what the experts say. Guidelines: at least 6-10 academic references.

Follow APA style guidelines for making proper literature citations in the body of the text. If you are not familiar with APA style, buy the manual. It is a requirement for this program. Follow APA guidelines for preparation of text, references, and appendices (if appropriate).

Some “example” usability attributes mentioned in the texts (there are more -- study hard and don't forget to review the principles of good design also):

learnability, efficiency, memorability, recovery from errors, user satisfaction, ease of use.....

Tips on Assignment #1 Format:

Title page – your full name, course #, title of your evaluation

Table of Contents

Introduction – about the issues and about the interface being evaluated

HCI issues or Usability Attributes/Principles Used to Evaluate the Interface (again, you have to be creative as to how you want to organize the issues or categories of the evaluation).

In depth discussion of the above relative to the interface

Recommendations for Improving the Interface Design

Conclusion

Reference List

INSTRUCTIONS FOR COMPLETING ASSIGNMENT #2:

Required Reading: (1) Review required texts for background on usability evaluation, (2) Review professor's notes on usability evaluation, (3) NSU IRB policy on Student Research (below), and (4) locate additional (outside) usability articles or sources.

The student will conduct a usability evaluation. The results of the usability evaluation can lead to valuable recommendations for improving the quality of the product under evaluation. This exercise will also give the student first-hand experience in assessing user interface design through systematic and direct observation. Note: these instructions are a GENERAL guide to usability evaluation. Your usability evaluation will have to expand this general method. Some of these issues may or may not be applicable to your usability evaluation.

General Method

You will need a minimum of **three** human subjects (participants) for this exercise. Choose a hardware platform and software product that you can arrange for your participants (one at a time, if necessary) to work through the major features of the software product or user interface you have chosen to evaluate. You will prepare a list of tasks that each subject will perform with a brief description of each task to be performed on the system. You may (if appropriate) prepare a flowchart showing the order tasks are to be performed and other important events and sequences. Your job, as the student researcher, is to give each participant written and/or verbal directions on how to complete the task; observe the subject working through the task; and record (on paper) the sequence of events. Upon collecting data from all invited participants, prepare a report describing the evaluation process and the results of the usability evaluation.

Important Policy on Human Subjects Research -- NSU Institutional Research Board (IRB) Policy on Course-related Research Activities

According to NSU IRB policy, research conducted by students as part of classroom assignments does not usually fall under the federal regulation of research because it is not intended or likely to lead to generalizable results. Rather, the activities are resources of teaching which facilitate learning of concepts and the opportunity to practice various procedures, including research methods (interviewing, observation and survey techniques, as well as data analysis).

While most assignments for class do not require IRB review, some do as a result of the vulnerability of subjects or the potential risk to subjects including:

- Studies in which children will be interviewed or surveyed.
- Studies in which children are being observed, and data collected, where the investigator is also a part of the activities being observed.
- Studies involving prisoners, the mentally disabled, or pregnant women.
- Studies that ask subjects about illegal activities and which place the data at risk for subpoena and/or the subject at risk for loss of civil liberties.

- Studies in which subjects are at risk of breach of confidentiality, such as ones that ask sensitive or intrusive questions about behaviors.
- Studies that place students at risk due to emotionally charged subject matter.
- Studies which will be published by the researcher (including theses and dissertations).

In conducting responsible usability evaluation, the student researcher must ensure that minimal risk in working with human subjects (e.g., our usability evaluation participants) is achieved. The professor of this course advises that students avoid conducting their usability evaluations that would fall into one or more of the seven exceptions (listed above) to IRB exemption on course-related activities. It is advised that invited participants are of adult age (18 years or older). Also, student researchers should not video tape or audio record participants for any part of this usability evaluation exercise. Finally, a Participant Informed Consent Form should be signed by all participants. (Example consent forms that are appropriate for usability evaluations are available in most usability evaluation texts.)

Students should review the NSU IRB policies as stated in full. These are posted on a link from the GCIS website (http://www.scis.nova.edu/~cannady/IRB_Info.htm). In addition, if the student wishes to publish or share results of the evaluation, in any form, outside of the course assignment and environment protocols established for this class, then IRB approval, prior to conducting the usability research, may be necessary. According to NSU IRB policy, IRB approval must be secured prior to conducting the research activities. (Given the short duration of this course and the involved process of seeking IRB approval, the professor does not recommend any outside publication or sharing of the results of this exercise.)

A reminder to student researchers in HCI: It is the product that is being tested, not the users! It is important that your invited participants are informed that they are not being tested, but rather the interface is being tested to locate potential usability problems!

GUIDELINES FOR CONDUCTING THE USABILITY EVALUATION

The following general guidelines have been adapted from the list of references at the end of this section. These guidelines are provided to give you some ideas for organizing your usability evaluation. Some guidelines will be applicable to your evaluation; some will not. Conversely, you may have other ideas not mentioned here that would appropriately fit your test goal.

As you plan, conduct, analyze, and report your usability evaluation or test, follow this format as appropriate:

Planning Stage

1. Identify the test goals.
2. Describe what test method(s) you will use to reach test goals.

3. Identify participants to perform the usability evaluation. (See IRB Policy stated above.) This process should give attention to:

- * a. user experience level/skills/capabilities
- * b. education
- * c. attitudes/willingness
- * d. demographics (age, sex, language, etc.). Invite those only of adult-age (18 years or older). Do not ask any intrusive information about the individual.
- * e. user satisfaction of the product

*Note: This information is normally generated through a questionnaire. You should develop a paper questionnaire or a list of interview questions to help you collect this information from your participants.

You may also need to determine the requirements of users in regard to:

- a. speed required of user
- b. skill required of user
- c. physical capability of user
- d. responsibility required of user
- e. ease of use considered for the user
- f. the user's potential for misuse or error

4. Create a task list. Create workable tasks that help the user evaluate the usability of the product design.

FOR EXAMPLE (these are not inclusive):

- a. Copy a table from a spreadsheet to a word processor document.
- b. Define a new printer.
- c. Print a document.
- d. Change a filename.
- e. Change the name of an icon.
- f. Change desktop colors and mouse speed.
- g. Move a file from one subdirectory to another.

5. Order and prioritize the tasks.

6. Determine which performance and subjective measurements to take.

7. Create the scenario (test lab) needed to conduct the evaluation (The "test lab" can be your office, home, or wherever you can set up the hardware and software.)

Remember to establish the following:

- a. workstation arrangement
- b. comfort/space of the testing lab

- c. modifiability of the testing environment
- d. room details (lighting/heat/air/cleanliness/noise/distractions)

8. In regard to tasks and task lists, be sure to:
- a. Provide a general description of each task to be performed.
 - b. Describe what steps are in each task.
 - c. Distinguish interaction with other tasks.
 - d. Identify if it is an individual or group task (as applicable).

Conducting the Test/Collecting Data

There are different strategies for structuring the evaluation for your participants. You can either have all participants work together at the same time (if you have access to multiple workstations), co-pair the participants at one time (if you have at least two workstations), or observe one participant at a time. Whichever option is workable for you, your main role will be to initially describe the evaluation procedures to the participant and RECORD their actions. (By RECORD, this means you will need to write down their actions on paper. Do NOT video or audio tape the participant – for IRB approval reasons.) It is recommended that you do not offer assistance to participants during the evaluation. The “think aloud” protocol is useful to ask participants to do. Ask them to tell you what they are doing and thinking as they work through the task list. Write down what they tell you. This may be important data, as later you try to analyze their reactions (and therefore the usability of the interface).

1. Explain and describe the procedures to the participant, including reasonable if simple rationale, if these seem needed to justify (perhaps unfamiliar) procedures.
2. Record on paper the participant’s actions during the usability evaluation. Recording possibilities could include, but are not limited to:
 - a. the participant's comments (This is known as the "Think Aloud" Method).
 - b. elapsed time spent on single tasks and through the overall evaluation.
 - c. time of day and the date participant completed the evaluation.
 - d. the number of errors the participant encountered. (Remember the focus on “errors” is on the interface design, not the user.)
 - e. the number of successes the participant gained.
 - f. how the user was able to recover from errors.
 - g. how often the user could not recover from errors, including processes various users attempted in their recover attempts.
 - h. how often the user sought help through online help or written documentation.
 - i. the number of times the participant sought assistance from the researcher.
 - j. the nature of the usability problem encountered.
 - k. the number of usability problems located during the evaluation period.

Be sure to follow good practices when working with your participants. Treat them with respect; explain you are evaluating the system, not them. Explain that they can stop the evaluation at any time, if they are uncomfortable, without penalty. Explain that their results will be reported, but without identifying information about them and without publishing the results (this is an educational exercise only). Express your appreciation and thank them for their participation. In following the rules of IRB, it is expected that any data collected as a class project will be destroyed after the grading of the project has been completed.

Reporting the Data

Prepare a report that describes what you did and what you found. Include the entire process (planning stage through collecting data) and the results of the usability evaluation. Write the usability evaluation in the strict third person. (The evaluator observed that.....). You should be able to highlight unique events that occurred on the basis of the participant's performance and your systematic observation. Identify the major variables associated with the usability of the product you have chosen (e.g. discuss learning factors, performance factors, error recovery factors, effort to complete a task or set of tasks, user's attitude toward program, etc). Give specific recommendations for improving the user interface in general. Discuss your results in relation to concepts presented in the required texts and in class discussions. Also, throughout the entire usability evaluation report, you should provide a substantial synthesis of current HCI literature sources that support or contradict findings relative to your usability evaluation. The report should be about **20 pages**, but may be longer depending on items that are included in the Appendices.

Format for the Usability Evaluation

1. Follow all standard format procedures (title page, line spacing, margins, proper citation format, etc.) as established in the GSCIS Dissertation Guide.
2. Provide an introduction section to describe what software or product is being evaluated and the general scope of the report.
3. The body of the report should contain an examination of the "process" of usability evaluation. The author should reflect on the process and integrate literature throughout the entire report to provide support for the discussion.
4. Provide a Reference List using strict APA format.
5. If appropriate, provide Appendices – can include surveys, task list, forms to organize observation and think aloud, other information gathering forms.

Note: Assignment #2 REQUIRES extensive discussion of detail about PROCESS. Outcomes are secondary to demonstrating an understanding of process. Synthesize the literature to support your notions or decisions regarding PROCESS.

**HUMAN-COMPUTER INTERACTION
ADDENDUM TO THE COURSE SCHEDULE IN SYLLABUS
READING ASSIGNMENTS -- SELECTED ACM ARTICLES**

Note: A variety of articles from publications of the Association of Computing Machinery (ACM) have been selected for reading during the term. This reading schedule is to be used in conjunction with the reading schedule in the syllabus. It is also to be used as reference material for assignments.

IMPORTANT! READ ME! -- While full citations are given below on all required articles to read, you must first access the NSU Electronic Library, go to the ACM Digital Library (requires NSU login and password from the NSU E-Library), and then search for these articles. At the end of this schedule, I give some tips on how to easily find these. Sorry, I can't link them directly, because copyright laws limit this.

Week #1:

Norman, D. (2005, November & December). There's an automobile in HCI's future. *Interactions*, XII.6, pp.45, 54.

Raskin, J. (1997, February). *Looking for a humane interface. Will computers ever become easy to use? Communications of the ACM*, 40, 2, pp. 98-101.

Week #2:

Marcus, A. (2003, September & October). When is a user not a user? Who are we? What do we do? *Interactions*, X.6, 28-34.

Week #3:

Chrusch, M. (2000, September & October). Seven great myths of usability. *Interactions*, ACM, 13-16.

Seffah, A. and Metzker, E. (2004, December). The obstacles and myths of usability and software engineering. *Communications of the ACM*, 47, 12, pp. 71-81.

Week #4:

Jeffries, R., Miller, J.R., Wharton, C., and Uyeda, K. (1991). User interface evaluation in the real world: a comparison of four techniques. *Conference Proceedings of the SIGCHI 1991 "CHI '91" Human Factors in Computing Systems Conference "Reaching Through Technology", April 27-May 2, 1991*, edited by Robertson, S., Olson, G., Olson, J.. New Orleans, LA. Addison-Wesley, Reading, MA. ISBN: 0-201-51278-5.

Parush, A. (2001, September & October). Usability design and testing. A question of balance. *Interactions*, pp. 13-17.

Wixon, D. (2003, July & August). Evaluating usability methods: Why the current literature fails the practitioner. *Interactions*, X.4, 28-34.

Week #5:

Jokela, T. (2004, November & December). When good things happen to bad products: Where are the benefits of usability in the consumer appliance market? *Interactions*, XI.6, pp. 29-35.

Bojko, A., Lew, G.S., & Schumacher, R.M. (2005, November & December). Overcoming the challenges of multinational testing. *Interactions*, XI.6, pp. 28-30.

Siegel, D.A. (2003, May & June). The business case for user-centered design: Increasing your power of persuasion.

Interactions, X.3, 30-36.

Week #6:

Avrahami, D. & Hudson, S.E. (2006). Responsiveness in instant messaging: Predictive models supporting interpersonal communication. *Proceedings of the ACM SIGCHI Conference '06*, Montreal, Quebec, Canada, 731-740.

Karat, J., Karat, C-M., and Ukelson, J. (2000, August). Affordances, motivation, and the design of user interfaces. *Communications of the ACM*, 43, 8, pp. 49-51.

Week #9:

Tohidi, M., Buxton, W., Baecker, R., & Sellen, A. (2006). Getting the right design and the design right: Testing many is better than one. *Proceedings of the ACM SIGCHI Conference '06*, Montreal, Quebec, Canada, 631-639.

Week #10:

Buie, E. (1999, March-April). *HCI standards: a mixed blessing*. *Interactions*, pp. 36-42.

Tremaine, M. (2001, September/October). Where do I start? *Interactions*, pp. 25-28.

Week #11:

Gweon, G., Rose, C.P. Carey, R., & Zaiss, A.S. (2006). Providing support for adaptive scripting in an online collaborative environment. *Proceedings of the ACM SIGCHI Conference '06*, Montreal, Quebec, Canada, ACM Press, 251-260.

Tips on How to Find These Articles in the ACM Digital Library:

1. Go to the NSU's Electronic Library from the main NSU web site (www.nova.edu). Under NSU Databases, review this first: How to Access Databases. (www.nova.edu/library/eleclib/remotensu.htm). See Browser settings. This is important for those of you NOT accessing the system on the local NSU LAN – you'll need to set up a proxy setting in your browser so that ACM recognizes that you are connecting through NSU. Also, see the link on "Troubleshooting" from the main NSU Electronic Library page.
2. Under NSU Databases, Click by Provider/Vendor or Databases in Alpha order. (The system will prompt you at some point to enter your name and NSU ID number.)
3. Select ACM Digital Library Database.
4. Once at ACM, you can search by the publication. ACM Interactions and Communications of the ACM can be found under "Magazines". The CHI Proceedings can be found under Proceedings. Select the appropriate category, then select the appropriate publication. Once you see the publication view, type in the last name of the author to search for the article title. From there you should be able to find the .pdf full text file to access the full article.

I was able to find all articles or conference proceeding papers this way.

End of Reading Schedule