DEPARTMENT OF COMPUTER SCIENCE
UNIVERSITY OF TORONTO

CSC 318W
THE DESIGN OF INTERACTIVE COMPUTATIONAL MEDIA
Winter Term, 2002-3

Assignment 2
REQUIREMENTS ANALYSIS

HANDED OUT: Tuesday, January 21, 4 p.m.
Assignment 2a DUE BACK IN via **email to TA**: Thursday, January 30, 4 p.m.
WORTH IN MARKING SCHEME: 3 points
Assignment 2b DUE BACK IN in **2 paper copies to BA7214**: Thursday, February 13, 4 p.m.
WORTH IN MARKING SCHEME: 12 points

THE PURPOSE AND TASK OF THIS ASSIGNMENT

The purpose of this assignment is to give you experience in understanding a set of users and their needs, and documenting this understanding in a thorough and thoughtful report (circa 20-35 pages, double-spaced), a report which will be useful for the following stages of your design.

Your report should address the following issues (this list may suggest an outline for your report):
1. What Rosson and Carroll call the "root concept", which we will abbreviate to the "concept".
2. Field studies (typically interviews and observations) to understand your users
3. Analysis and summaries of insights from these user contacts
4. Scenario(s) encapsulating what you have learned about these users and their tasks
5. A brief statement and analysis of claims about the scenario(s)
6. A very brief statement of implications for design

It should also include relevant material as Appendices, for example, interview protocols (guides to asking questions) or questionnaires.

1. The concept sets the context for a requirements analysis, and would typically include items such as:
- a vision statement of the basic idea for your term project
- the rationale supporting the vision statement
- a listing of the stakeholders who will be involved
- an enumeration of any assumptions you are making.

The vision statement and rationale should state the problem you intend to solve (i.e., the need that a set of target users have) and the goals for a solution. The stakeholders should include but are not limited to the "target users". Describe your target users in more detail in the Stakeholder Descriptions in #3a that follows.

2. Carry out one or more field studies in order to understand your prospective users. Chapter 2 of the text, and Readings #3 (Preece, et al.), #4 (Baecker, et al.), and #5 (Lewis and Rieman) will be helpful. Your paper must document what you have done in this area and the ideas and insights gained from these activities.

FIELD STUDY METHODS FOR UNDERSTANDING USERS

2a. Try to pretend that you are the user. For example, if you are designing for senior citizens, imagine that you are a senior, and try to do what seniors do, that is, carry out the activities and tasks that seniors do by yourself. (Beware of generalizing too far, but first-hand experience is always useful.) This technique is actually not part of the field study, but a useful warmup exercise.

2b. Talk with the intended users, asking them about the relevant aspects of their lives, their problems, difficulties, wishes, and needs. You can carry out these conversations using *interviews* or *questionnaires*. See Reading #3 (Preece, et al.). You must use *one* of these techniques, whichever is more convenient and more appropriate. The interview technique is probably a better one for you to use at this stage, but the decision is yours. Carry out the interviews or administer the questionnaire with at least 3 or 4 informants.

2c. Visit the workplaces or living spaces of users, observing the kinds of environment and organizations in which your users now work, live, learn, and play.

2d. Observe users in their environment, observing what they do and how they do it. In many cases, it is desirable to have them *think aloud* as they are carry out tasks and activities.

In practice, some of the above activities would be carried out by video taping interviews with and behaviours of your intended users. We cannot in this course make available the equipment to do this, but some of you may have access to videotape equipment yourselves. Instead, you may find it helpful to tape record your sessions with users, possibly to transcribe them, and definitely to review and analyze them.

Before carrying out your field studies, you need to develop a plan (a research protocol) and a consent form, which you must submit to your TA by January 30th as Assignment 2a. This is described starting on page 5 of this document.

3. Your next task is the abstract from the field studies relevant information in a form that is useful for design. You should produce *stakeholder descriptions* and *workplace themes*, and at least one and preferably both of the following: either a *task analysis* or a set of *artifact analyses*.

3a. *Stakeholder descriptions* are used to describe in some detail your target users as well as other classes of people who play important roles in the lives of your users. For example, if you were designing for senior citizens, they could be characterized in terms such as:

- age (e.g., elderly, very elderly)
- educational level (e.g., high school, university, advanced degrees, etc.)
- health (e.g., healthy, having specific illnesses, infirmities, or handicaps, etc.)
- familiarity or expertise with computers and technology (e.g., novice, intermediate, highly skilled)
- feeling about technology (e.g., comfortable, nervous, hostile, etc.)
- relevant activities (e.g., learning, communicating, playing cards, taking medications, etc.)
- geographical setting (e.g., in an apartment, on a tennis court, at a doctor's office, etc.).

See the examples in the text to see examples of the kinds of descriptions that are appropriate. Other stakeholders for seniors would include groups such as spouses of seniors, caregivers, family members, and medical professionals.

3b. Carry out a *task analysis* of some relevant task (see Chapter 2 of the text, and also Reading #5, Lewis and Reiman). Task analysis is the process of identifying, understanding, systematizing, and documenting the significant activities and processes whereby a user carries out a task.

3c. Carry out at least two *artifact analyses* of objects, documents, or other features of the relevant environment of your users. Artifact analyses describe objects that are essential to your users' lives and to the carrying out of their tasks and activities. If you have access to a camera, you may wish to include some photographs in your report. You may also include photocopies of documents. See Chapter 2.

3d. Name and write a very brief description of at least two *workplace themes*. A workplace theme is a category or issue central to the lives of your users. In the case of senior citizens, for example, you would interpret the term "workplace" broadly to include where they live and spend their time. The theme description abstracts some of what you have observed about the users that will be central to your design. See Chapter 2.

4. Prepare at least one *scenario* describing the life of your target users and other stakeholders that is relevant to the concept. The scenario(s) should make use of what you have learned in your stakeholder descriptions, task analysis, artifact analysis, and theme descriptions. The scenario(s) can be expressed in text as illustrated in Chapter 2 of the text. If you have the appropriate skills, they could also be augmented with visual sketches, as in a *storyboard*, for example. (A storyboard is a sequence of visual images that represent successive stages in a scenario, animation, or video.) They could even be created as a video, but that is certainly not required.

5. Prepare at least two *situation features* arising in the scenario(s) and claims, both "pro" and "con", about these features. The features encapsulate what has occurred in the scenarios involving your users and the other stakeholders that is most important for suggesting appropriate directions for your design. Each feature is analyzed by a small set of claims that assert what is good (+) or bad (-) about the feature. See Chapter 2.

6. Conclude by adding any additional statements you may want to make that reflect what you have learned that is relevant to your design project. This section is recommended but optional.

7. Add Appendices of material that is not germane to the central arguments of your paper but would be helpful to your TA (or, for that matter, to you in later stages of the project). These could include:
- interview protocols (guides to asking questions)
- questionnaires
- raw data transcribed from interviews or observations
- copies or photographs of artifacts too numerous to include in the body of the paper

KEEPING THIS ASSIGNMENT WITHIN BOUNDS

If you spend more than 18-21 hours per person on this assignment, you are spending too much time. To achieve this goal, it is very important that *all* members of your group participate actively and collaborate in the work.

Although every report will be different, it seems likely that you can do a reasonable job of dealing with each issue as follows:

Issue 1:	1-2 pages
Issue 2:	6-9 pages (likely augmented with some appendices)
Issue 3:	9-13 pages
Issue 4:	2-4 pages
Issue 5:	1 page
Issue 6:	1 page
Appendices:	as appropriate

WHAT YOU SHOULD HAND IN FOR ASSIGNMENT 2b

You need to hand in your report, **one report per group**., in **two copies to BA7214**.

The report must be typed and submitted on 8.5"X11" paper. Structure and organization, spelling, grammar, word usage, and document appearance will count for roughly 15-20% of your grade. Sketches, diagrams, and tables should be used where appropriate to assist in conveying the concepts. **Papers submitted that are not written in minimally acceptable English will be returned for rework and resubmission.**

Each submission must include a title page with a meaningful title, your names, your student ID#s, your tutor's name, the course name and number, and the date. The second page should contain a very short one-paragraph **executive summary** of the document, a **table of contents**, and a statement of **who did what on this assignment**.

WHAT YOU SHOULD HAND IN FOR ASSIGNMENT 2a

You need to email in a research protocol (page 9), with appended Research Instrument (page 10) and Consent Form (page 11), **one set per group**, to your TA. These should either be:

• attachments of Microsoft Word documents; or
• plain text in the body of the email.

Further instructions appear on pages 5-11.

ASSIGNMENT 2a: RESEARCH PROTOCOL

Purpose: To develop as part of your assignment a sound research protocol and informed consent materials for your participants, and thereby to ensure that your work on this assignment will be planned thoughtfully, and also to adhere to University of Toronto and TriCouncil ethics policies regarding the use of human subjects in research.

Instructions: Read the material below (adapted from the University of Toronto and Tricouncil Policies on ethical requirements in the use of human participants), and follow the guidelines and instructions to create a research protocol and consent form that describes how you will interact with your target users for requirements analysis. When you have completed these documents, submit them by e-mail to your TA. They will be reviewed by your TA and returned to you with either approval or a list of any needed revisions, if possible within 48 hours of submission.

Introduction

Moral considerations impose certain limitations upon research. Not everything that can be done ought to be done; not everything that is expedient is right. While recognizing the vital importance of research to human progress, we affirm that consideration for the welfare and integrity of the individual or collectivity must prevail over the advancement of knowledge and the researcher's use of human participants for that purpose.

It follows that certain individual and/or collective interests must be maintained, such as the potential participant's interest in being fully informed about the nature and purpose of the research in which participation is being sought, so that a relevant choice can be made to grant, withhold or withdraw consent. The potential participant's interest in knowing the risks and benefits involved in participation in the proposed research must be respected, as must the interest in privacy, meaning the right to control the information other people have about him or her. Any intended or foreseeable limitation of privacy by breach of confidentiality must be disclosed, and freely accepted by the participant as a pre-condition to his or her inclusion in the study.

Similarly, regarding research on groups, members of a society have an interest which must be respected in regulating the entry of "outsiders" for the purposes, for instance, of examining their sacred and ceremonial places, removing and storing religious and cultural objects, or of exhibiting and disposing of such objects as artistic creations, documents or implements. Cultural groups have a comparable entitlement to accurate and respectful description of their heritage and customs, and to the discreet use of information on their daily lives.

Privacy and Confidentiality

In many cases the relation of researchers to participants is limited to collecting data by observation and/or interrogation, without physical contact or intervention; participants may provide researchers with information simply by being watched, by answering questions, or by filling in questionnaires. Whether the information sought is about the individual participant or not, the participant's privacy may be invaded by the researcher, and this is justifiable only by clear consent, or, for instance, the voluntary and public nature of the conduct observed.

The privacy of a person may also be invaded by the perusal of identifying or identified information about him or her. The key ethical consideration in such use of identified or

identifying information is that the privacy of a person should not be invaded except with that person's consent, and must be protected at all times. Further, all identified or identifying information obtained from the participant of research is best treated as confidential, and all reasonable efforts must be made to prevent its falling into unauthorized hands.

A wide variety of information can identify a participant. In the case of written information, this may be the participant's name, but it may also be the participant's telephone number. In tape recordings or videotape, a person may be identifiable by voice or appearance. When a participant is described as a member of a small group, the smaller the group the more stringent the need to protect individual identity.

Confidentiality clearly requires that researchers be scrupulous when publishing research results in preserving the anonymity of participants, whether they be individuals or institutions. Where identifying disclosure is intended possible or unavoidable, the participants' information for consent should include this fact.

The Research Protocol
A research protocol is a document that includes information on the following four matters. A recommended format for the protocol document is also included.

Summary
Provide a very brief summary of the design of the research and the issues it addresses. You must include a sample of any questionnaire or interview protocol that you will use.

Participants
You must very briefly describe the participants for investigation and the method of recruiting them, including reference to their ages or age range; the place where the investigation will be carried out; who will be responsible for contacting potential participants; how they will be approached initially; and what you will tell them before they consent to participate.

Risks and benefits
(a) Risks: A very brief estimate of the risks participants will take as part of their participation in the research must be stated. Will they experience any discomfort or incapacity? What facilities will be available to protect the health, safety and confidentiality of participants?
(b) Benefits: A very brief statement of who (the participants, the investigators, society) will benefit from participation must be included.

Consent
What explanation will investigators give to potential participants before they may agree to become participants in the project? What is the competence of individual participants freely to consent? Free and adequately informed consent is required in writing in almost every case, so a consent form must be submitted with the protocol, or an adequate explanation must be given, of why the group proposes that consent should not be in writing.

Protocol format
Groups should follow this format closely. A boilerplate is attached at the end of the assignment.

1. The title of the proposed research.
2. The names and departments of the investigators.
3. A statement of the purpose of the research.
4. A description of the procedures to be used in the conduct of the research, specifically stating particulars (e.g., participating in an hour-long, semi-structured interview)
5. A description of the participant population.
6. A statement of the investigator's relationships to the participants.
7. An assessment of the possible risks and benefits to the participants.
8. A description of the procedures that will be followed to obtain informed consent. The consent form should be attached, as well as any accompanying documentation, such as an information statement.
9. A statement of any remuneration or other compensation that will be provided to the participants, and the terms of this compensation.
10. A description of the information sought and the sources to be used. The information sought can be described by including the questionnaire or interview protocol.
11. If the information is confidential, the safeguards to be provided a) to obtain the consent of both the participants and any other persons having authority over the information, and b) to preserve the confidentiality of the data when collected.

With the exception of the procedures (item 4), consent form (item 8), and information sought (item 10), each point can be answered in one or two sentences.

Consent Form and Explanation
The participant should be given both an oral explanation and a document containing a full, fair and comprehensible description of the purpose, design and procedures of the research and of its risks, discomforts and inconveniences. The document should also contain an explanation that the procedure is not primarily designed for the participant's benefit, and a statement to the effect that the participant is free to withdraw at any time before or during the research.

The primary reason for requiring consent is the ethical principle that all persons must be allowed to make decisions and to exercise choice on matters which affect them. Their autonomy must be safeguarded to the greatest possible extent. They are entitled to any information that might affect their decision. They are entitled to refuse to participate in research on any grounds, rational or not.

Information for consent
Participants should receive, in a language in which they are fluent, such information about the proposed study and their prospective role in particular as they will require to permit them fairly to select whether or not to participate. The investigator has the burden of anticipating what this may be, and must state in the protocol what information is to be given, and by what persons and means. The protocol must state what prospective participants will be told of:

- the reasons for the study;
- its methods affecting the participant;
- the basis of selecting the participant to take part;
- the reasonably anticipated benefits and consequences of the study and of the participant's participation (if no benefits, this should be stated);
- the risks (if any) of the procedures in which the particular participant would be involved;

- the procedures for ensuring the participant's confidentiality.

It should be stated that the participant who consents to participate may withdraw at any time, without explanation, sanction or prejudice.

A boilerplate is appended at the end of this assignment.

Boilerplate for **Research Protocol** (to be modified as appropriate and included in Assignment 2a)

1. Interviews and Observations of <kind of potential users to be studied>

2. <Names and student numbers of all members of the team>

3. The purpose of our research is to understand <kind of potential users to be studied> to help us derive requirements for the design of novel interactive computational media based on wearable computers that are intended to be useful to such individuals. A brief description of our design concept is: <one-paragraph description>

4. We will brief the participants about the purpose of the study, explain the consent form to them, and ensure that they sign the consent form. We will then engage the participants in <process to be used, for example, an hour-long, semi-structured interview>. We will also with their permission make observations as follows: <description of observation procedures to be used and the workplace or living space or environment in which the study will be conducted>.

5. Participants will be chosen from <kind of potential users to be studied>. They will be identified via <process to be followed> and selected according to <basis or criteria to be used>. In general, they will be characterized by <characteristics such as age, gender, occupation, industry, geographic location, etc.>.

6. Our relationship to the participants may be described as follows: <description of relationship>.

7. There will be minimal risk to the participants. The only benefit will be to contribute to the education of the investigators. Participants are free to withdraw before or any time during the study without the need to give any explanation.

8. We will brief the participants about the purpose of the study, explain the consent form to them, and ensure that they consent to participate and sign the consent form. The consent form is attached.

9. Participants will receive no compensation.

10. The information to be sought is described in the attached <guideline to asking questions in a semi-structured interview, or questionnaire, or survey form, or whatever research instrument will be used>.

11. Information will be kept confidential by the investigators. Names or other identifying or identified information will not be kept with the data. The only other use will be to include excerpts or copies in the assignment submitted, but names and other identifying or identified information will not be submitted.

Research Instrument (to be modified as appropriate and included in Assignment 2a)

< Method of interacting with participants, list of questions to be asked and topics to be discussed, and follow-up questions and topics to be used under certain circumstances>

Consent Form (to be modified as appropriate and included in Assignment 2a)

<Title of Study>

I hereby consent to participate in a research study conducted by ____<name of investigator>___ for an assignment in University of Toronto Computer Science 318, Design of Interactive Computational Media.

I have been told that the purpose of the study in which I agree to participate is <description of the purpose of the study>.

I have also been given the following information:
a) The procedures to be used in the study
b) That I will receive no benefit or compensation for my participation
c) That I am free to withdraw before or any time during the study without the need to give any explanation
d) That all materials and results will be kept confidential, and, in particular, that my name and any identifying or identified information will not be associated with the data.

_____<Signature of participant> _____
<Name of participant>

_____<Signature of investigator> _____
<Name of investigator >

Toronto, <date>