DEPARTMENT OF COMPUTER SCIENCE
UNIVERSITY OF TORONTO

CSC 428F/2514F

HUMAN-COMPUTER INTERACTION

Lecture 5

USER AND TASK ANALYSES:
INTERVIEWS AND QUESTIONNAIRES

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5.1 User and task analysis

A user / task analysis seeks to uncover:

>   What the user skill sets are
>   What the user's work environment is like
>   How users perform their tasks now
>   What language, mental models users employ in their work
>   What objectives they might have for a product
>   How users might actually use a product

Reasons to conduct a user / task analysis

>   Information may lead to abandoning a bad idea
>   e.g., video telephones, recipe management programs

>   Information may lead to very good ideas
>   e.g., designers use their second hand to orient and
>   frame their work (led to development of Toolglass)

>   Assumptions designers have about users and interface
>   may be wrong, e.g.,
>   All users are alike
>   All users are like me
>   A person is either a novice or an expert
>   User characteristics don't matter for this product
>   Can design a good UI without understanding the user

5.2 Information captured through task analysis

User characteristics
>   Task experience and domain knowledge, e.g., by
>   radiologists, telephone switchboard operators
>   Computer literacy, e.g., systems & application experience

Users' conceptual model

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Task structures and organizational patterns,
        e.g., order taking, order entry, shipping, billing
Artifacts or objects used in tasks, e.g., files, forms
Organization of artifacts,
        e.g., page->section->chapter->book->library

Work flow patterns
        Who performs which tasks and how often
        Communication patterns among workers

Interrrelationships between tasks and artifacts
        How specific forms and files are used in order entry

Users' use of information in the environment
        Things perceived visually, e.g., materials on hand
        Things perceived acoustically, e.g., conversations
                of co-workers, opening of door

Users' use of other technologies, e.g., phones, voice mail, fax

5.3 Methods for user and task analysis

Observational methods (Lecture 18)
        Notetaking
        Audio recording
        Video recording
        Think-aloud protocols
        User testing

Goals of observational methods
        Observe, describe, and understand current work practice
        Observe, describe, and understand system usage
        Listen to users thinking and talking about their work
        Collect qualitative data, e.g., mental models, emotions
        Collect quantitative data, e.g.,
                How many?

How often?
How long?

Methods employing asking questions (Lectures 5-6)
Surveys, questionnaires, interviews

5.4 Example: task analysis via observing phone operators

Study of directory assistance workers as knowledge workers
(Muller, et al., 1995)

First, qualitative study using participatory design techniques in
which workers describe their work tasks and work flow
using paper-and-pencil sketches and card images

Result was a description of the work of DA operators, as
typified by the prototypical call appearing in Figure 5.1.

Next, quantitative analysis of direct, video taped
observation of one hour of live traffic handled by each
of ten operator participants, analyzed with the
assistance of the operators

Used to understand operators' knowledge work (Figs. 5.2, 5.3)

Results later reconfirmed by a second quantitative study

Figure 5.1 An example of a DA call, focusing on operator's knowledge work (Muller, et al., 1995, p. 132)

See text for image.

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Figure 5.2 Occurrences of knowledge work in DA calls (Muller, et al., 1995, p. 133)

See text for image.

Figure 5.3 Types of knowledge work in DA calls (Muller, et al., 1995, p. 133)

See text for image.

5.5 Questionnaires and interviews

Questionnaires and interviews can be used to measure:
        Prior knowledge (task domain, computers)
        Attitudes
        Personality traits, cognitive abilities
        How the user does his or her work
        User needs
        User satisfaction
        User comprehension

Questionnaires and interviews cannot be used to measure
        information of which users are unaware:
        What command names to use
        How to organize items in a menu
        How a user learns commands
        Where the user will make errors
        Which colours enhance visibility of display items

Quest. & int. are used in all phases of the development cycle
        Early, as part of information gathering
        In conjunction with user testing of prototype or product
        After system has been delivered

5.6 Basic principles of questionnaires and interviews

Talk to key users and representative users

Plan in great detail, and pilot test the questions
        Yet allow for flexibility given unforseen circumstances

Keep the number of questions low
        Only questions that impact system design
        Only seeking information that can't be obtained in other
            way, e.g., by observation, or via system logs

Be careful with question design
    Questions that are clear
    Questions that can be answered validly and reliably
    Questions that are likely to be answered truthfully, i.e.,
        not about sexual or criminal behaviour

More in next lecture

5.6 Example: study of electronic desktop management

Recall lecture 2 about TimeStore time-based information
    management system

Yiu developed an understanding of his users and their
    behaviour by interviewing them based on the
    questionnaire shown in Figure 5.4

5.7 Example: the EuroPARC human memory studies

The design problem: Aiding people's memories with a
    portable memory aid, to be implemented with a hand-
    held personal information manager (a ParcTab)

Research and development at Rank Xerox EuroPARC
    beginning in 1990

Began with 3 studies:
    A study of memory problems at work, using a questionnaire
    Recording of the events of people's days on video
    Classification of basic work activities, and analysis of
        people's use of daily schemas in recalling the
        events of the day, using interviews

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Memory lapse questionnaire (Figures 5.5, 5.6)
    Most frequent problems were mixture of prospective
    memory lapses (i.e., forgetting about future events) and
    retrospective ones (i.e., forgetting about past events)

Video recording of work days
    Playing back video records is a powerful assist to
    aiding the memory of past events

Memory schema study (i.e., task analysis of work activities)
    Qualitative and quantitative analysis of activities, e.g.,

Meeting, conversations	24%
Moving through building	12%
Telephone calls	11%
Desk activities	11%
Electronic mail work	11%
Other workstation activities	11%
Other	21%

    Analysis of recall, showing the surprising result that
    people were more likely to forget atypical activities

5.8 References

Muller, M.J., et al., Telephone Operators as Knowledge Workers: Consultants
    Who Meet Customer Needs, *CHI'95 Proceedings*, 130-137

Newman and Lamming, *Interactive System Design*, Case Study B:
    Designing a Human memory Aid, 411-439

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Figure 5.4a TimeStore user questionnaire (Yiu 1997, 52)

Initial Interview Questions

All interviews were informal. The initial interview took place after a short demonstration of TimeStore. The purpose of the interview was to gather basic information about the user, their current email system, and their email usage pattern. Some of the questions asked in this interview were the same as the ones in the previous TimeStore study [Silver, 96].

General Information:

1. What is your occupation?

2. How many years of computer experience do you have?

3. What platforms have you used in the past? Describe the level of expertise on the computer systems that you have used? (novice, competent, guru)

4. What is the platform you are using now?

5. What applications do you usually run on your computer?

6. How many years have you been using email?

Information on User's Current Email Usage:

1. What is your primary email system?

2. Why did you choose this program?

3. How many email accounts do you use with this system?

4. How many email messages do you have in your system?

5. How many messages in general do you receive in a day?

6. How many messages are from mailing lists, and how many are directed to you personally?

7. How often do you check for new messages?

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Figure 5.4 bTimeStore user questionnaire (Yiu 1997, 53)

8. How many locations from which you access your email? How do you access your mail remotely?

9. Do you use the status settings (Eudora Users only)?

10. Do you use the priority settings? Labels (Eudora Users only)?

Reading and Filing Strategies:

1. What is the percentage of messages that you read completely?

2. What is the percentage of messages that you keep?

3. How do you categorize your mail (a single inbox, multiple mailboxes, etc)?

4. How many messages are in the inbox (if mail system supports an inbox)?

5. What type of messages do you save? Delete?

6. Do you delete messages that were filed?

7. How often do you clean up your mailboxes?

8. Do you use the rule-based filtering feature to file messages (if applicable)?

Retrieval Strategies:

1. How often do you need to retrieve old messages? Usually from how long ago?

2. What is your usual strategy when you need to retrieve older messages?

3. How often do you have problems finding a message?

4. What problems have you experienced when you are trying to locate a message?

5. When you have problems locating a message, what information do you remember about the message but could not make use of in the search?

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Figure 5.4 cTimeStore user questionnaire (Yiu 1997, 54)

6. When you do have problems locating a message, where you able to find the message in the end? How long did it take you?

Initial Impression of TimeStore

1. What do you like about TimeStore?

2. What don't like about TimeStore?

3. Do you think TimeStore will be useful to you? For which tasks?

4. Do you think you will be using the Calendar feature?

5. Do you think you will be using the Tasks feature?

6. Do you think you will be using the Notes feature?

7. Do you think you will be using the Address Book feature?

8. Do you think you will be using the Mailbox View feature?

9. Other specific comments on the interface, interaction styles, etc.

Daily Usage Questions and Final Interview Questions

As mentioned before, users were asked to think-aloud when they are using TimeStore. The result was then captured into a movie file. At the end of each day, the users were asked to answer a set of questions if relevant.

1. What did you do with TimeStore today?

2. What did you like about TimeStore?

3. What areas in TimeStore were superior to your usual email system?

4. What did you dislike about TimeStore?

5. What areas in TimeStore were inferior to your usual email system?

6. Describe any problems you had with TimeStore today. Were they severe?

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Figure 5.4 dTimeStore user questionnaire (Yiu 1997, 55)

7. Do you have any suggestions for improving the user interface?

A brief weekly interview would also be held to gather other comments that the questions may have missed. Users were encouraged to freely discuss what they think about TimeStore.

Final Interview Questions

The objective of the final interview was to determine if the user's impressions of TimeStore had changed. We also wanted to know what their opinion of the system was after four weeks of regular usage. In the final interview, the users were asked the following questions:

1. Did you like using TimeStore?

2. What did you like?

3. What did you dislike?

4. Do you like the time-based concept? Was it useful?

5. Did you find the calendar feature useful?

6. Did you find the task feature useful?

7. Did you find the association of messages with tasks useful?

8. Did you find the notes feature useful?

9. Did you keep persistent mailbox views? Why or Why not?

10. What would make TimeStore better?

11. If TimeStore was built with all the features that most email systems have (better SMTP/POP3 support, mailing list support, MIME / BinHex decoding, etc), would you keep using TimeStore?

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Figure 5.5a Memory lapse questionnaire (Newman & Lamming, 1995, 420-1)

See text for image.

Figure 5.5b Memory lapse questionnaire (Newman & Lamming, 1995, 420-1)

See text for image.

Figure 5.6a Memory lapse results (Newman & Lamming, 1995, 417-8)

See text for image.

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Figure 5.6b Memory lapse results (Newman & Lamming, 1995, 417-8)

See text for image.