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Task Analysis

The general term Task Analysis can be applied to a variety of techniques for identifying and understanding the structure, the flow, and the attributes of tasks. Task analysis identifies the actions and cognitive processes required for a user to complete a task or achieve a particular goal.

A detailed task analysis can be conducted to understand the current system and the information flows within it. These information flows are important to the maintenance of the existing system and must be incorporated or substituted in any new system. Task analysis makes it possible to design and allocate tasks appropriately within the new system. The functions to be included within the system and the user interface can then be accurately specified.

Some of the outputs of a task analysis include:

- A detailed description of physical, perceptual, and cognitive activities involved with each task
- Task duration and variability
- Task frequency
- Task sequence
- Task allocation
- Task complexity
- Environmental conditions
- Data and information dependencies
- Tools required for the task
- User skills, education, and training

Cognitive task analysis and **Hierarchical task analysis** are commonly used task analysis techniques. Examples of other task analysis techniques are: Conceptual Task Analysis, **GOMS**, Timeline Analysis, Tabular Task Analysis, Operator Action Event Trees (OAET), Critical Action and Decision Evaluation Technique (CADET) and LINK Analysis.

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Assembling the data

The data for the Task analysis can be assembled from several places including business requirements, user research, existing competitive products and brainstorming.

Procedure

Task decomposition

The aim of "high level task decomposition" is to decompose the high level tasks and break them down into their constituent subtasks and operations. This will show an overall structure of the main user tasks. At a lower level it may be desirable to show the task flows, decision processes and even screen layouts (see task flow analysis, below)

The process of task decomposition is best represented as a structure chart (similar to that used in **Hierarchical task analysis**). This shows the sequencing of activities by ordering them from left to right. In order to break down a task, the question should be asked "how is this task done?". If a sub-task is identified at a lower level, it is possible to build up the structure by asking "why is this done?". The task decomposition can be carried out using the following stages:

1. Identify the task to be analysed.
2. Break this down into between 4 and 8 subtasks. These subtasks should be specified in terms of objectives and, between them, should cover the whole area of interest.
3. Draw the subtasks as a layered diagram ensuring that it is complete.
4. Decide upon the level of detail into which to decompose. Making a conscious decision at this stage will ensure that all the subtask decompositions are treated consistently. It may be decided that the decomposition should continue until flows are more easily represented as a task flow diagram.
5. Continue the decomposition process, ensuring that the decompositions and numbering are consistent. It is

usually helpful to produce a written account as well as the decomposition diagram.

6. Present the analysis to someone else who has not been involved in the decomposition but who knows the tasks well enough to check for consistency.

Task flow diagrams

Task flow analysis will document the details of specific tasks. It can include details of interactions between the user and the current system, or other individuals, and any problems related to them. Copies of screens from the current system may also be taken to provide details of interactive tasks. Task flows will not only show the specific details of current work processes but may also highlight areas where task processes are poorly understood, are carried out differently by different staff, or are inconsistent with the higher level task structure.

Variations

If the tasks are already well understood, it may be sufficient to just identify and document the tasks as part of **context of use analysis**.

According to Dan Saffer the task analysis can consist in a raw list of features that the final application will have to carry. (Saffer, Designing for Interaction: Creating Smart Applications and Clever Devices , 2006)

Examples of tasks broken down

Brushing teeth

- Pick up the tooth brush
- Wet the brush
- Take the cap off the tube
- Put paste on the brush
- Brush the outside of the bottom row of teeth
- Brush the outside of the top row of teeth
- Brush the biting surface of the top row of teeth
- Brush the biting surface of the bottom row of teeth
- Try to make yourself understood while answering the question of someone outside the door
- Brush the inside surface of the bottom row of teeth
- Brush the inside surface of the top row of teeth
- Spit
- Rinse the brush
- Replace the brush in the holder
- Grasp cup
- Fill cup with water
- Rinse teeth with water
- Spit
- Replace cup in holder
- Wipe mouth on sleeve
- Screw cap back on tube

Borrow book from library

- go to the library
- find the required book
- access library catalog
- access the search screen
- enter search criteria
- identify required book
- note location
- go to correct shelf and retrieve book
- take book to checkout counter

Tools

TaskArchitect is a tool that supports Hierarchical Task Analysis.

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