STATUS Submitted 02/23/2017
REQUEST DATE 02/22/2017
SOURCE WSILL
BORROWER UFH
LENDERS NAT, *MNV

NEED BEFORE 03/24/2017
RECEIVE DATE

TYPE Copy
OCLC # 35205516
DUE DATE N/A

LOCAL ID T10.5 .I57 1996, pg 223-224
AUTHOR International Technical Communications
TITLE 1996 proceedings : 43rd Annual Conference : Evolution/revolution : May 5-9, 1996, Washington
IMPRINT Arlington, VA : STC, ©1996.

ALERT

VERIFIED WorldCat (35205516) Physical
MAX COST 0.00 USD
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LEND RSTR

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ISBN 9780914548898
FORMAT Book
EDITION
ART AU Basil J. White
ART TITLE Developing Products and their Rhetoric from a Single Hierarchical Model
VOL/NUM 43
DATE 1996

FAX NUM 202-273-9125
EMAIL vhacoill@va.gov
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Developing Products and Their Rhetoric from a Single Hierarchical Model

Basil J. White

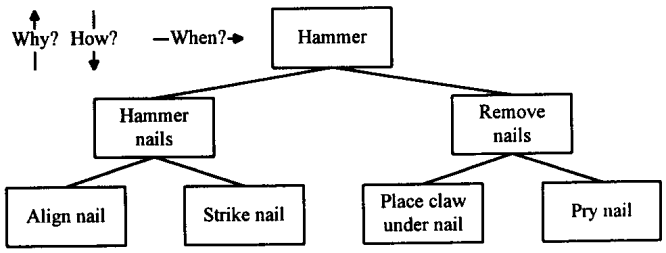
Goal hierarchies are models that represent a set of problems or goals. Goal hierarchies can also represent the goals of a product, and the information that should be provided to explain the product. A single goal hierarchy can direct the design of both the product and all rhetoric about the product. Goal hierarchies can direct the design and ordering of the tasks required to build the product. They can also define the structure and order of its accompanying text, online help, hypertext, training, and customer support heuristic. Goal hierarchies were used to enhance development of a specific Department of Veterans Affairs information product and its accompanying rhetoric.

HISTORY AND FUNCTION

There are several models for representing systems, such as flowcharts and electrical schematics(1). Technical communicators also use models, such as outlines and graphs, to represent these systems. However, there are no prevailing models that direct both product design and instructional design. However, products and their instructions, at least in theory, emerge from the same set of goals or problems. Goal hierarchies are used in cognitive science to represent problem-solving plans designed for a system, as well as the human tendency to respond to difficult goals by dividing them into subgoals(2). Models in psychology that describe how people divide goals into smaller tasks might be used to represent the goals of a product and determine the content and structure of product rhetoric.

A HYPOTHETICAL EXAMPLE

To build a goal hierarchy, a designer must be able to determine the goals of the product and assign an order to these goals. The designer must also determine the tasks that sufficiently achieve each goal and assign an order to these tasks. Designers must also determine the actions for each task and their proper order. Some goal hierarchies have many subordinate levels, but most hierarchies have at least three levels. The following model is a potential goal hierarchy for a hammer:



To build the hierarchy, the designer can interview the developers of the product to determine the goals for the product, the tasks for each goal, and the actions for each task. Goals are superordinate to tasks and actions, and actions are subordinate to tasks and goals. Subordinate elements, or *nodes,* tend to answer "How?" questions about superordinate nodes. Superordinate nodes tend to answer "Why?" questions. Agents move from left to right among the subordinate nodes to achieve the state of their superordinate.

A PROBLEM OF ORDER

The most subjective task in building a goal hierarchy is determining the proper order of goals within a subject, or tasks within a goal, etc. Researchers in artificial intelligence use different criteria for different applications of goal hierarchies. Some nodes occur in a particular order out of necessity. Some nodes have one optimal order that allows the agent that uses the hierarchy to achieve the goal fastest or with the fewest number of steps. Other nodes are ordered according to an established social convention(3). Other researchers advocate determining the prerequisite knowledge needed for each task. These pedagogical hierarchies order the tasks so that the essential information for each task provides the agent with the greatest amount of reusable information for future tasks(4).

PRODUCT DESIGN

Hopefully, the designer builds the goal hierarchy before the developers have committed to a prototype, because the hierarchy can assist in the development of the product before the physical features of the product are determined. In the hammer example above, the hierarchy indicates that the hammer being designed is a claw hammer, because removing nails was a stated goal. Building the goal hierarchy can illustrate assumptions that designers have about the product that otherwise might not have been explicit. Also, companies that design systems for a client can show the partitioning of expenses for each

goal that the product helps users achieve. Reporting expenses in a goal hierarchy might be a useful way to explain the causes for increased costs as customers increase their development requirements. Goal hierarchies can be incorporated into software metrics and reporting to predict and represent workhours required to make the product sufficient for accomplishing each task and goal(5).

LINEAR TEXT DESIGN

A goal hierarchy can be used as an outline for linear text. In the example above, the hammer documentation might consist of two chapters, "Hammer Nails," and "Remove Nails." A "Hammer Nails" chapter would have two sections, "Align Nail," and "Strike Nail." Different goals require different sizes of text, so each goal might represent a series, document, chapter, section or subsection.

ONLINE HELP DESIGN

Online help products can be designed from the goal hierarchy. Context-sensitive help products can be enhanced by a hierarchy of topic pages with the same content and structure as the goal hierarchy.

HYPERTEXT DESIGN

Hypertext products can use a goal hierarchy as an outline for building topics and links among topics. Because of the relational power of hypertext, a goal hierarchy can be one of several outlines in which a user can consult a hypertext product. For example, a hypertext product could allow users to choose among a goal-based, feature-based, or string-based search. This method would organize product information based on the user's perception of what they know and need to know.

TRAINING DESIGN

Training, like linear text, assumes a defined linear progression through the information. Goal hierarchies can define the structure of training and measure how far individual students have progressed in their learning. Different goals require different amounts of training, so the goals in a hierarchy might represent a series, course, meeting, or class activity.

CUSTOMER SUPPORT HEURISTIC DESIGN

Users of information products often rely on the support of experts to help them resolve a problem with the product or to use the product to accomplish a task or goal. A goal hierarchy can describe the strategy that experts use to determine what questions to ask in order to understand the problem, task or goal. Supervisors can organize these experts according to the hierarchy, and use the hierarchy to determine which goals and tasks are discussed most often during these calls. Developers of the product can also use this problem-frequency data to direct their enhancement of the product. Testers can use the goal hierarchy as an outline for designing product tests, and for reporting specific points of failure in which users stop progressing toward test goals.

A REAL EXAMPLE

A goal hierarchy was used to rewrite user documentation for IFCAP, a budget and procurement information product used by the Department of Veterans Affairs. The goal hierarchy was enhanced to direct the naming and structure of an additional set of functions in response to a new customer requirement.

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Basil White
Publications Analyst
Department of Veterans Affairs
Suite 200, 8403 Colesville Road
Silver Spring, MD 20910
(301) 427-3700

Mr. White received BAs in psychology and technical writing from the University of Memphis in 1990. He expects to receive an MA in Science Writing from Johns Hopkins this fall. His thesis, an extension of this paper, should be available in November.