Recall of previous experience is an important part of the everyday understanding and problem solving people do. In this project, we investigated some of the ways in which previous experience is remembered and stored. Our investigations led us to the conclusion that experience plays two important roles in reasoning: (1) it contributes to generalization and incremental learning and (2) it provides exemplars to aid in later understanding and problem solving. Four experience-related processes that enable these functions are (1) similarity-triggered generalization, (2) failure-triggered explanation, (3) similarity-triggered analogical transfer and (4) experience-driven plan evaluation. Two experimental computer programs begin to implement these processes and the underlying episodic memory structure required to support the use of experience in reasoning. The MEDIATOR recalls previous experience to resolve common-sense disputes, and SHRINK uses previous cases to reason about psychiatric diagnosis. The framework we propose, along with the programs we use to test it, provide a foundation for the creation of computer problem solving and understanding systems which can learn from and improve based on experience. They also provide a better understanding of the remembering and learning people do as a result of experience.
Data on Scientific Collaborators

Co-Investigators

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Research Assistants

*Dana Eckart, graduate student - Sept. 1982 - Sept. 1983
*Phil Hutto, graduate student - July 1983 - Dec. 1983
*Katia Sycara, graduate student - Sept. 1983 - June 1984

Robert Simpson, graduate student

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*paid thru NSF grant
PUBLICATION CITATIONS

Publications (already published):


Publications (submitted and pending):

Kolodner, Janet L. and Simpson, Robert, Problem Solving and Dynamic Memory (long version), to be submitted for special issue of Cognitive Science devoted to "memory, experience, and reasoning"

Publications (accepted, but not yet printed):


Technical Reports:


Publications (in preparation):


Proposals based on this work (awarded):


Proposals based on this work (submitted and pending):


Presidential Young Investigator, Submitted to NSF, 1984, up to $100,000 per year for 5 years.
Proposals based on this work (in preparation):

Experience and Problem Solving. To be submitted jointly to ONR, Division of Instructional Technology and to ARI.

Research in Experience's Role in Problem Solving. To be submitted to NSF, Division of Information Science and Technology as addition to currently-funded NSF grant.

Conference presentations (invited):


Panel member "Information, the Challenge of the 80's: Immediate Access and Availability" at ACM National Conference, Dallas, Texas, October, 1982.

Panel member for Women in Science Careers Workshop, Atlanta, Georgia, September, 1981.

Conference presentations:


The Role of Experience in Developing Expertise, presented at the National Conference on Artificial Intelligence, Pittsburgh, Pennsylvania, August, 1982.


Knowledge-Based Self-Organizing Memory for Events, presented at NATO Symposium on Artificial Intelligence, Lyon, France, October, 1981.