Allen Newell

Born March 19, 192 7, San Francisco, Calif.; died July 19, 1992, at Montefiore Hospital in Pittsburgh, Pa.; with Herbert Simon and John Shaw in 1957, first articulated a rule-based model of human and computer problem solving.

Education: BS, physics, Stanford University, 1949; postgraduate studies, Princeton University, 1949-1950; PhD, industrial administration, Carnegie Institute of Technology, 1957.

Professional Experience: research scientist, Rand Corporation, 1950-1961; Carnegie-Mellon University: associate professor, 1961-1976, professor, 1976-1992.

Honors and Awards: AMPS Harry Goode Award, 1971; ACM Turing Award, 1975; Alexander C. Williams Jr. Award, Human Factors Society, 1979; IEEE Computer Society Pioneer Award, 1980; Distinguished Research Contribution Award, American Psychological Association, 1985; Research Excellence Award, International joint Conference on Artificial Intelligence, 1989; IEEE Emanuel R. Piore Award, 1990; Louis E. Levy Medal, Franklin Institute, 1992; National Medal of Science, 1992; honorary doctor degrees, University of Pennsylvania, Groeningen University (Netherlands); member, National Academy of Science; member, National Academy of Engineering; member, American Academy of Arts and Sciences; fellow, IEEE.

Newell earned an international reputation for his pioneering work in artificial intelligence, the theory of human cognition, and the development of computer software and hardware systems for complex information processing.

Newell's career spanned the entire computer era, which began in the early 1950s. In computer science, he worked on areas as diverse as list processing, computer description languages, hypertext systems, and psychologically based models of human-computer interaction.

A native of San Francisco, Newell received a bachelor's degree in physics from Stanford University in 1949. He spent a year at Princeton University doing graduate work in mathematics, and worked for the Rand Corporation as a research scientist from 1950 to 1961. While at Rand, he met Nobel Laureate Herbert A. Simon, then a professor of industrial administration at Carnegie Institute of Technology, now Carnegie Mellon University. Their discussions on how human thinking could be modeled led Newell to go to Pittsburgh so the two could collaborate. Newell earned a doctor's degree in industrial administration from CIT's business school in 1957.

Newell joined the CIT faculty as a professor in 1961. He played a pivotal role in creating Carnegie Mellon's School of Computer Science and elevating the school to world-class status.

The fields of artificial intelligence and cognitive science grew in part from his idea that computers could process symbols as well as numbers and, if programmed properly, would be capable of solving problems in the same way humans do. In the 1960s (in particular) Newell and Herb Simon created computer models of human problem solving. This work was one of the major forces behind the “cognitive revolution” in psychology.

Throughout his research career, his work touched on architectures to support intelligent action in humans and machines. Since the early 1980s his research interests were centered on the development of SOAR, a cognitive architecture realized as a software system capable of solving problems and learning in ways similar to human beings. As a proposed unified theory of cognition, the goal of SOAR is to provide an underlying structure that would enable a computer system to perform the complete range of mental tasks. SOAR has been in use since 1986 as a framework for intelligent system design at research institutions around the world.

Newell, a professor of psychology and Helen Whitaker professor of computer science at the time of his death, wrote and coauthored more than 250 publications, including ten books. He coauthored *Human Problem Solving* with Simon in 1972, and coauthored *The Psychology of Human-Computer Interaction* with two colleagues in 1983. His last book, *Unified Theories of Cognition*, published by Harvard University Press in 1990, is based on the thesis that tools are at hand that will allow psychologists to start to develop a unified theory describing many different types of behavior, instead of building separate theories to cover isolated aspects, as has long been the practice.

Newell's awards and honors include the Harry Goode Award of the American Federation of Information Processing Societies (1971); the A.M. Turing Award of the Association for Computing Machinery, jointly with Simon (1975); the Alexander C. Williams Jr. Award of the Human Factors Society (1979); the Distinguished Research Contribution Award of the American Psychological Association (1985); the Research Excellence Award of the International joint Conference on Artificial Intelligence (1989); the Emanuel R. Piore Award of the Institute for Electrical and Electronic Engineers (1990); and the Franklin Institute's Louis E. Levy Medal (1992). He was awarded honorary doctoral degrees by the University of Pennsylvania and Groeningen University in the Netherlands.

Newell was a member of the National Academy of Sciences, the National Academy of Engineering, and the American Academy of Arts and Sciences. He was the first president of the American Association for Artificial Intelligence and president of the Cognitive Science Society. In 1987 he delivered the William James Lectures to the Department of Psychology at Harvard. Those lectures formed the basis for his book *Unified Theories* of *Cognition.*

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UPDATES

Portrait changed (MRW, 2013)