David Klahr
Walter van Dyke Bingham Professor of Cognitive Development and Education Sciences

Department of Psychology
Pittsburgh, PA 15213
http://www.psy.cmu.edu/~klahr/

Carnegie Mellon University
Phone: (412) 268-3670
klahr@cmu.edu

EDUCATION

S.B. (1960)	Electrical Engineering, Massachusetts Institute of Technology
M.S. (1965)	Graduate School of Industrial Administration, Carnegie Institute of Technology
Ph.D. (1968)	Graduate School of Industrial Administration, Carnegie Mellon University
	Major Area: Organizations and Social Behavior
	Thesis: Decision Making and Search in a Complex Environment

EMPLOYMENT HISTORY

1964-1966	Instructor, Mathematics Department, Carnegie Institute of Technology
1966-1967	Instructor, Graduate School of Business, University of Chicago
1967-1969	Assistant Professor of Behavioral and Information Sciences, Graduate School of Business, University of Chicago (on leave 1968- 1969)
1968	Visiting Research Fellow, Department of Education, University of Stirling, Scotland
1969	Visiting Fulbright Lecturer, London Graduate School of Business Studies
1969-1976	Associate Professor, Graduate School of Industrial Administration and Department of Psychology, Carnegie Mellon University
1976 -	**Professor, Department of Psychology, Carnegie Mellon University**
1983-1993	Head, Department of Psychology, Carnegie Mellon University
1988-1996	Director, Literacy in Science Center, Carnegie Mellon University
2005 -	**Training Director: Program in Interdisciplinary Education Research**
2005 -	**Executive Committee and Education Director: Pittsburgh Science of Learning Center**

PROFESSIONAL ACTIVITIES

Member:
- National Academy of Education
- Cognitive Science Society
- Society for Research in Child Development
- Cognitive Development Society (Board of Governors 2003-08)
- International Society for the Psychology of Science and Technology (ISPST)

Fellow:
- Inaugural Fellow, American Educational Research Association
- Division 7 (Developmental), American Psychological Association
- Division 3 (Experimental), American Psychological Association
- Founding Fellow, American Psychological Society

Journal Consulting Editorships or Reviewer:

American Educational Research Journal	*American J. of Psychology*	*Child Development*	*Cognitive Development*
Cognitive Psychology	*Cognitive Science*	*Communications of the ACM*	*Developmental Psychology*
Human Development	*International Journal of Behavioral Development*	*Instructional Science Journal of Business*	*Journal of Experimental Child Psychology*
JEP: General	*Journal of Math Education*	*Journal of Math Psychology*	*JASA*
Management Science	*Memory & Cognition*	*Merrill-Palmer Quarterly*	*Psychological Bulletin*
Psychological Review	*Psychometrika*	*Review of Educational Research*	*Science*

Series Editor: *Carnegie Mellon Symposia on Cognition*

Grant Reviewer:	Institute of Education Sciences	National Science Foundation
	National Institute of Mental Health	Australian Research Grants Committee
	Canadian Research Council	Institute for Education Sciences

AWARDS and GRANTS

Active:
2004 – 2014   **Co-PI on NSF Science of Learning Center**
2004- 2014   **IES: Training Director, Pre-Doctoral training grant: Program in Interdisciplinary Education Research (PIER)**
2010 - 2013   **IES: Promoting Transfer of the Control of Variables Strategy in Elementary and Middle School Children via Contextual Framing and Abstraction**
2011- 2014   **IES: Training Director, Post-Doctoral training grant: PostPIER (with V. Aleven & K. Koedinger)**

RESEARCH INTERESTS

Learning Sciences, Education Sciences, especially problem solving instruction, scientific discovery in children and adults, instructional interventions in science.

EDUCATIONAL INTERESTS

Names of Courses Taught (Prior to 2000)
Data Processing and Computer, Interpersonal Behavior, Human Behavior, Programming Digital Computers, Mathematical Models in the Behavioral Sciences, Organizations: Structure and Process, Management Information Systems, Mathematical Analysis for Business. Simulation of Cognitive Processes, Development of Quantitative Processes, Cognitive Development, Seminar on Scientific Reasoning , Cognitive Processes and Problem Solving, Psychological Processes in Decision Making, Social Psychology (Introduction), Cognition and Instruction, Introduction to Child Development.

Recent Courses
Research Methods in Child Development, Seminar on Children and Computing, Freshman Seminar on the Psychology of Scientific Thinking, Seminar on Scientific Research in Education

Selected PUBLICATIONS (from a full set of over 120)

Books

Klahr, D. (Ed.). (1976). *Cognition and instruction*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Klahr, D., & Wallace, J. G. (1976). *Cognitive development: An information processing view*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Klahr, D., Langley, P., & Neches, R. (Eds.). (1987). *Production system models of learning and development*. Cambridge, MA: MIT Press.

Klahr, D., & Kotovsky, K. (Eds.). (1989). *Complex information processing: The impact of Herbert A. Simon*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Klahr (2000) *Exploring Science: The Cognition and Development of Discovery Processes*.   Cambridge, MA: MIT Press.

Carver, S. M. & Klahr D. (Eds.) (2001) *Cognition and Instruction: 25 years of progress*. Mahwah, NJ: LEA

Contributing author to following publications of the National Academy of Sciences

Pellegrino, J. W, Chudowsky, N. & Glaser, R. (Eds.) (2001) *Knowing What Students Know: The Science and Design of Educational Assessment* . Washington, DC.: National Academies Press. (Committee on the Foundations of Assessment).

Towne, L., Wise, L. L. & Winters, T. M. (Eds.) (2004) *Advancing Scientific Research in Education*. Washington, DC.: National Academies Press. (Committee on Research in Education)

Duschl, R. A., Schweingruber, H. A., & Shouse, A. W. (Eds.) (2007) *Taking Science to School: Learning and Teaching Science in Grades K-8* . Washington, DC.: National Academies Press. (Committee on Science Learning, Kindergarten through Eighth Grade.)

Journal Articles and Book Chapters   (Not Including Conference proceedings)

Klahr, D. (1966). A computer simulation of the paradox of voting. *American Political Science Review*, *LX*, 384-390.

Klahr, D. (1969). Decision making in a complex environment. *Management Science, 15*, 595-618.

Klahr, D. (1969). Statistical significance of Kruskal's nonmetric multidimensional scaling technique. *Psychometrika, 34*, 190-204.

Klahr, D., & Wallace, J. G. (1970). The development of serial completion strategies: An information processing analysis. *British Journal of Psychology, 61*, 243-257.

Klahr, D., & Wallace, J. G. (1970). An information processing analysis of some Piagetian experimental tasks. *Cognitive Psychology, 1*, 358-387.

Klahr, D. (1973). Quantification processes. In W. G. Chase (Ed.), *Visual information processing* . New York: Academic Press.

Klahr, D., & Wallace, J. G. (1973). The role of quantification operators in the development of conservation of quantity. *Cognitive Psychology, 4*, 301-327.

Chi, M.T.H. & Klahr, D. (1975). Span and rate of apprehension in children and adults. *Journal of Experimental Child Psychology, 19*, 434-439.

Klahr, D. (1978). Information processing models of cognitive development. In J. Scandura & C. Brainerd (Eds.), *Structural/process theories of complex human behavior* (pp. 479-518). A.W. Sijthoff International Publishing Company.

 <u>Reprinted as:</u>

  Klahr, D. (1980). Information processing models of cognitive development. In R. Kiewe & H. Spada (Eds.), *Developmental Models of Thinking*. New York: Academic Press.

  Klahr, D. (1981). Informationsverarbeitungsmodelle der Denkentwicklung. In R. Kiewe & H. Spada (Eds.), *Studien zur Denkentwicklung Bern*, Stuttgart, Wein: Huber.

  Klahr. D. (1984). Modelos del Desarrollo Intelectual Basados en el Procesamiento de la Informacion. In M. Carretero & J. A. Garci'a Madruga (Eds.), *Lecturas de psicologia del pensamiento* Madrid: Alianca Editonaia.

1980 - 1990

Klahr, D. (1982). Non-monotone assessment of monotone development: An information processing analysis. In S. Strauss & R. Stavy (Eds.), *U-shaped behavioral growth*. New York: Academic Press.

Klahr, D., & Robinson, M. (1981). Formal assessment of problem solving and planning processes in preschool children. *Cognitive Psychology, 13*, 113-148.

Klahr, D., Chase, W. C., & Lovelace, E. (1983). Structure and process in alphabetic retrieval. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 9(3)*, 462-477.

Klahr, D. (1985). Solving problems with ambiguous subgoal ordering: Preschoolers' performance. *Child Development, 56*, 940-952.

Carver, S.M., & Klahr, D. (1986). Children's acquisition of debugging skills in a LOGO environment. *Journal of Educational Computing Research, 2(4)*, 487-525.

Shrager, J., & Klahr, D. (1986). Instructionless learning about a complex device. *International Journal of Man-Machine Studies, 25*, 153-189.

Neches, R., Langley, P., & Klahr, D. (1987). Learning, development and productions systems. In D. Klahr, P. Langley, & R. Neches (Eds.), *Production system models of learning and development*. Cambridge, MA: MIT Press.

Klahr, D., & Dunbar, K. (1988). Dual space search during scientific reasoning. *Cognitive Science, 12(1)*, 1-55.

Klahr, D., & Carver, S.M. (1988). Cognitive objectives in a LOGO debugging curriculum: Instruction, Learning, and Transfer. *Cognitive Psychology, 20*, 362-404.

1990 - 2000

Klahr, D., Dunbar, K. & Fay, A.L. (1990). Designing good experiments to test `bad' hypotheses. In J. Shrager & P. Langley (Eds.), *Computational models of discovery and theory formation* . San Mateo, CA: Morgan-Kaufman.

Klahr, D., Fay, A.L., & Dunbar, K. (1993) Developmental differences in experimental heuristics. *Cognitive Psychology, 25*., 111-146.

Klahr, D. (1995) Computational models of cognitive change: the state of the art. In T. Simon & G. Halford (Eds.) *Developing cognitive competence: New approaches to process modeling*. HIlsdale, NJ: Erlbaum.

Klahr, D. & Carver, S. M. (1995) Scientific Thinking about Scientific Thinking. *Monographs of the Society for Research in Child Development*. #245, vol. 60, no. 4, 137-151.

Fay, A. & Klahr, D. (1996) Knowing about guessing and guessing about knowing: Preschoolers' understanding of indeterminacy . *Child Development*., 67, 689-716.

Klahr, D. (1996) Scientific Discovery Processes in Children, Adults, and Machines In D. Steier & T. Mitchell, Eds., *Mind Matters: Contributions to Cognitive and Computer Science in Honor of Allen Newell* Hillsdale, N.J.: Erlbaum.

Penner, D. E., & Klahr, D. (1996). When to trust the data: Further investigations of system error in a scientific reasoning task. *Memory & Cognition*, 24 (5), 655-668.

Penner, D. & Klahr, D. (1996) The Interaction of Domain-Specific Knowledge and Domain-General Discovery Strategies: A Study with Sinking Objects. *Child Development*, 67, 2709-2727.

Klahr, D. (1996) Cognitive determinants of collaborative ebb and flow. *Bulletin of the Japanese Cognitive Science Society*, 3, 6-7.

 Reprinted in K. Ueda and T. Okada (Eds.) (2000) In search of collaborative cognition: *Cognitive science on creative collaboration*. Kyoritsu Shuppan. Tokyo. (In Japanese)

Klahr, D. (1999) The Conceptual Habitat: in What Kind of System Can Concepts Develop? In E. K. Scholnick, K. Nelson, S. A. Gelman, & P. H. Miller, (Eds.) *Conceptual Development: Piaget's Legacy*. Mahwah, NJ: Lawrence Erlbaum Associates, pp. 131 - 161.

Chen, Z. & Klahr, D., (1999) All Other Things being Equal: Children's Acquisition of the Control of Variables Strategy, *Child Development* , 70 (5), 1098 - 1120.

Klahr, D. & Simon, H. A. (1999) Studies of Scientific Discovery: Complementary Approaches and Convergent Findings. *Psychological Bulletin,* 125 (5), 524-543 .

2000 - 2010

Klahr, D. & Simon, H. A. (2001) What have psychologists (and others) discovered about the psychology of scientific discovery. *Current Directions in Psychological Science*. 10(3), 75-83

Klahr, D. & Kotovsky, K. (2001) A life of the mind: Remembering Herb Simon. *APS Observer*, 14,14–33.

Klahr, D. (2001) Directions to "Eureka!" *Science*, 292, 2009

Triona, L. M. & Klahr, D. (2003) Point and Click or Grab and Heft: Comparing the influence of physical and virtual instructional materials on elementary school students' ability to design experiments *Cognition & Instruction*, *21*, 149-173.

Klahr, D. & Chen, Z. (2003) Overcoming the "positive capture" strategy in young children: Learning about indeterminacy. *Child Development, 74*, 1256-1277.

Klahr, D. & Nigam, M. (2004) The equivalence of learning paths in early science instruction: effects of direct instruction and discovery learning. *Psychological Science, 15*, 661-667.

Klahr, D. (2005) Early Science Instruction: Addressing Fundamental Issues. *Psychological Science, 16*, 871-872.

Klahr, D. & Li, J. (2005) Cognitive Research and Elementary Science Instruction: From the Laboratory, to the Classroom, and Back. *Journal of Science Education and Technology*, 4, 217-238.

Klahr, D., Triona, L. M., & Williams, C. (2007) Hands On What? The Relative Effectiveness of Physical vs. Virtual Materials in an Engineering Design Project by Middle School Children. *Journal of Research in Science Teaching* , 44, 183-203

Masnick, A. M., Klahr, D., & Morris, B. J. (2007) Separating signal from noise: Children's understanding of

Triona, L. & Klahr, D. (2008) "Hands-on science: Does it matter what the student's hands are on in 'hands-on science? *The Science Education Review*.

Chen, Z. & Klahr, D., (2008) Remote Transfer of Scientific Reasoning and Problem-Solving Strategies in Children. In R. V. Kail (Ed.) *Advances in Child Development and Behavior,* Vol. 36. (pp. 419 – 470) Amsterdam: Elsevier

Strand-Cary, M. & Klahr, D. (2008). Developing Elementary Science Skills: Instructional Effectiveness and Path Independence. *Cognitive Development*, 23, 488–511.

Newcombe, N. S., Ambady, N., Eccles, J., Gomez, L., Klahr, D., Linn, M., Miller, K., & Mix, K. (2009) Psychology's Role in Mathematics and Science Education. *American Psychologist*, Vol. 64, No. 6, 538–550

Dovidio, J. F, Durso, F. T, Francis, D. J., Klahr, D., Manly, J. J. & Reyna, V. F. (2009) *Psychology as a Core Science, Technology, Engineering, and Mathematics (STEM) Discipline*. APA Presidential Task Force Report: http://www.apa.org/science/about/psa/2010/08/stem-report.pdf

2010 - 2013

Klahr, D., Zimmerman, C. & Jirout, J. (2011) Educational interventions to enhance, enrich, and encourage children's scientific thinking. *Science, 333,* 971-975

Siler, S, A., Klahr, D., & Price, N. (2012) Investigating the mechanisms of learning from a constrained preparation for future learning activity. *Instructional Science*, *DOI: 10.1007/S11251-012-9224-7.*

Siler, S. A. & Klahr, D. (2012) Detecting, Classifying and Remediating Children's Explicit and Implicit Misconceptions about Experimental Design. In Proctor, R. W., & Capaldi, E. J. (Eds.), *Psychology of Science: Implicit and Explicit Processes*. New York: Oxford University Press.

Jirout, J. & Klahr, D. (2012) Children's scientific curiosity: In search of an operational definition of an elusive concept. *Developmental Review, 32, #2, 125 – 160*.

Matlen, B, & Klahr, D. (2012) Sequential Effects of High and Low Instructional Guidance on Children's Acquisition and Transfer of Experimentation Skills. *Instructional Science*

Klahr, D. (2013) What do we mean? On the importance of not abandoning scientific rigor when talking about science education. *Proceedings of the National Academy of Sciences*.

Koedinger, K.R., Booth, J.L., & Klahr, D. (2013). Instructional complexity and the science to constrain it. *Science, 342,* 935-937.