Teaching Scientific Reasoning Skills: A Case Study of a Microcomputer-Based Curriculum

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One major concern of science education is preparing students to live in a rapidly changing society. In order to recognize, address, and shape new scientific and technological changes, students need not only understanding of scientific facts from the natural and physical sciences, but also problem-solving skills. These expert thinking skills do not develop spontaneously. Science educators must look for ways to encourage and develop such important inquiry skills in their students.

The recent incorporation of new information technologies into schools offers science education an unprecedented opportunity to reconsider traiditional approaches to science curricula. In our instance, the integration of 16 microcomputers into a middle-class, eighth grade classroom has resulted in dramatic curricular changes. As researchers of the Computer as Lab Partner Project from the University of California at Berkeley, we are currently investigating the educational potential offered by Microcomputer-Based Laboratories (MBL)—a new class of probeware and software for real-time data collection and presentation. The Project's curriculum focused on three specific objectives: a) to teach the subject matter; b) to teach graph interpretation skills; and c) to foster students' scientific reasoning skills. This

Teaching Mathematics And Science Patterns Of Microcomputer Use

Richard J. Shavelson

Teaching Mathematics And Science Patterns Of Microcomputer Use:

[Teaching Mathematics and Science - Patterns of Microcomputer Use](#) Rand Corporation,1984 **Teaching Mathematics and Science** Richard J. Shavelson,1984 **Resources in Education** ,1986 [Microcomputers in Education](#) ,1984 **A Bibliography of Selected Rand Publications** Rand Corporation,1988 **Administrative Policies for Increasing the Use of Microcomputers in Instruction** John D. Winkler,1986 *Children and Microcomputers* Milton Chen,William Paisley,1985-06 Microcomputers have been acquired in homes and schools faster than any educational technology in history The pace of these technological changes presents social researchers with many stimulating questions Children and Microcomputers is a compilation of research on children s use of microcomputers It gives a brief history of microcomputers and related microprocessor technologies together with an analysis of their distinguishing features and patterns of diffusion The contributors review past and current research on utilization and effect and project future directions for research **How Effective Teachers Use Microcomputers for Instruction** ,1984 To summarize cluster analyses of various instructional decisions and tasks employed by effective microcomputer using teachers revealed four characteristic patterns of use orchestration enrichment adjunct instruction and drill and practice Orchestrators are distinguished by their multiplicity of uses and degree of integration between microcomputer use and ongoing instruction Enrichers appear to encourage student familiarity with the microcomputer within a less ambitious instructional program Adjunct instroctors appear to use the microcomputer selectively to enhance conceptual mastery within the subject matter Drillers seem to provide students with an extensive program of drill and practice on the microcomputer to enhance mastery of procedures *Microcomputers and Education* Jack A. Culbertson,Luvern L. Cunningham,1986 **"Successful" Teachers' Patterns of Microcomputer-based Mathematics and Science Instruction** ,1984 **Journal of Research on Computing in Education** ,1987 **District and School Incentives for Teachers' Instructional Uses of Microcomputers** Cathleen Stasz,1985 **Selected Rand Abstracts** Rand Corporation,1984 Includes publications previously listed in the supplements to the Index of selected publications of the Rand Corporation Oct 1962 Feb 1963 **The Education & Human Resources Program** Linda Darling-Hammond,1988 **Investigations in Mathematics Education** ,1986 **Teaching with Technology** ELIZABETH ANNA UZDAVINIS CARLSON,1991 goals for the teaching and learning that occurred in their classrooms *Alberta Journal of Educational Research* ,1987 *Use of Tool Software to Employ the Computer as a Learning Tool for the Teaching of Mathematics* William Michael Casolara,1986 *New Information Technologies in Higher Education* Cristian Calude,Dumitru Chitoran,Mircea Malitza,1989 An overview of the current status of new information technologies NIT in teaching training research and administration of higher education internationally includes 25 papers The Impact of NITS of Higher Education C Calude and M Malitza Educational Implications of Artificial Intelligence M A Boden On Theory of Knowledge L Iliev Computer Technology and Education L P Steier New Information Technologies The Role of

Artificial Intelligence G S Pospelov and The Challenges of Cognitive Science and Information Technology to Human Rights and Values in University Life M Pellery Computers at Stanford An Overview P Suppes The Use of the Personal Computer in Education at the University of Buckingham J E Galletly End User Computing A Challenge for University Organization P Baumgartner and S Payr The Influence of Informatics and the Use of Computers in the Content and Methodology of Higher Education H Mohle and Informatics in Higher Education in Switzerland excerpt from a report on informatics issued by the Federal Ministry for Education and Science Searching for Patterns of Knowledge in Science Education A Kornhauser Medical Educational Computing D Ingram Patient Simulation by Computer C A S E S Software for the Construction of Computer Patients H A Verbeek Microcomputers in Statistical Education the Buckingham Experience E Shoesmith Courses in Computer Graphics in Faculties of Mechanical Engineering in Czechoslovakia J Novak On the Way to Chaos An Analysis of a Family of Logistic Models T Kinnunen Educational Technology and the New Technologies P W Verhagen and T Plomp A Knowledge Base for Instructional Design F C Roberts Facilities Concerning the Infrastructure for Development of CAI in Advanced Further and Higher Vocational Education in the Netherlands R van Asselt Some Thoughts on Structures Objectives and Management of Centres for Computation Sciences and Software Technology D Bjorner and The Social Impact of Technology An Issue for Engineering Education A Bitzer and R Sell and The Emergence of Institutional Research and the Use of Microcomputers New Roles for Institutional Researchers in Western Europe Higher Education Institutions E Frackmann The Student Information System of the University of Helsinki A Heiskanen The Impact of Information Technologies on University Administration R Bouchet and An International Centre for Computers and Informatics ICCI to Promote Third World Development M Munasinghe SM **Technology Enriched Schools** Betty Collis,Gerrit Carleer,1992 Technology enriched school projects are initiatives in real school settings that try to reduce or remove problems and constraints that hamper the effective use of computers in the schools These projects are based not on technology but on educational need and vision They examine the atmosphere and functioning of a school that uses technology for change and stimulation The following case studies from technology enriched schools are presented 1 Mount Newton A Technology Enriched Middle School Keven Elder 2 California Model Technology Schools The Monterey Perspective Kam Matray 3 Apple Classroom of Tomorrow West High School Robert Howard and Jane Pratt 4 Technology Enriched Schools in the Netherlands Jef Moonen and Jos Beishuizen 5 An Information Technology School Project in Romania Ion Diamandi 6 Computerization of an Israeli School System Project Comptown Elad Peled Zimra Peled and Gad Alexander 7 School of the Future Project at F M Black Middle School Richard A Smith and Anthony Sassi 8 The Quinte Lighthouse Project Robert Holt and 9 Netherhall School Building for the Future on the Experience of the Past Alastair J Wells Synthesis and reflections are provided by the editors in Summarizing the Case Studies of Technology Enriched Schools and Reflections on Technology Enriched Schools Five appendixes summarize details about the projects Contains 33 references SLD

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