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Barbara Rogoff, Editor

# Computer Networking for Child Development

Laboratory for Comparative Human Cognition (LCHC),
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We report on our experiences using computer-based telecommunications as a tool for research and teaching, to describe our efforts in what we perceive to be a flood of interest in the implications of new information technologies for issues of concern to developmentalists.

## *Teleconferencing between school children*

Thousands of school-aged children are being exposed to a new form of educational activity in which they exchange information and engage in joint projects with children in far off places. These activities are arranged on local and international levels with structures that vary between large bulletin board, data retrieval systems to closely/clearly focused projects linked through telecommunication to create a system of educational activity (Hiltz & Turoff, 1978; Levin, Riel, Rowe & Boruta, 1986; Taylor, 1980). We will describe two types of projects with which we have some familiarity to give a flavor of the scope and content.

Projects linking classrooms through telecommunications find their organization structured by decisions on curriculum content versus technological demands. One of the early and ongoing projects that attempted to combine within-classroom educational activity with between-site cooperation using telecommunications was mounted by a group of our colleagues at UCSD including Jim Levin, Bud Mehan, and Margaret Riel (Riel, 1986). This work has grown into an Intercultural Learning Network which links students, teachers, and researchers from such distant locations at Hawaii, Alaska, Tokyo, Jerusalem, and San Diego. Through the network, students from several countries collaborated on research projects about their environment —both physical (e.g., weather, schools, living space) and cultural (e.g., family histories). These projects focused on collecting actual data, exchanging the data and analyzing the expanded collective data base. The students shared their data through telecommunication, proposed new stages in the researoh, and carried on a discussion with the others as an exploration of weather patterns.

These students also cooperated in writing a joint newspaper. Early work on creating a joint newspaper writing project with children in Alaska highlighted the crucial role of joint goal formation, the need for coordination over considerable periods of time, and the importance of linking within-context activities to between-context cooperative efforts in using this new medium. It also demonstrated the power of this medium to support effective educational activity.

When teachers carry out standard curriculum units with the added feature of telecommunication, telecommunication can be used either to promote discussion between distant groups and clusters of groups, or to collect and share centralized information. Newer projects are attempting to combine both these features (Kidnet, the new ATT network), and initial reports suggest that such projects have great power to involve children in genuine educational activity (Tinker, 1987).

## *Computer networking in research on teaching and learning*

We have found computer-mediated networking to be an asset in our research on learning and development,

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especially our efforts to elucidate the role of cultural mediation in development, to include a wide range of cultural groups in collaborative work, and to create model activity systems that implement our theories about how to empower weaker students.

*Conversations to compositions: Mixing on and off-line.* Telecommunications can be used in a "real time" mode for what amounts to written conversations. For example, "composations" (Griffin and Cole, 1986) evolved as an activity to serve the goals related to increasing writing performance of children who, under other circumstances, spend a great deal of time writing very little and, hence, have little material and motivation for editing and revision. We worked with two groups of children characterized as low academic achievers, one primarily black, the other primarily hispanic.

For a "composation" children first engage in a computer-mediated written conversation with someone (or group) "on-line" at the same time. After the written conversation is over, the electronic record of it stored in the computer can be used as the basis for a composition by copying the record into a word processing program. Hence the *conversation* can be the basis for a *composition*.

This activity allows us to investigate "inter-psychological" conversation developed as an asset for "intra-psychological" composition. Furthermore, it allows us to investigate how diverse favored discourse forms that emerge in spontaneous (although written) conversations can become an advantage as the children turn to well-specified academic writing tasks.

Alonzo Anderson

## *Horizontal and vertical integration in educational contexts*

Like many developmental psychologists, we believe that one way to engineer developmentally productive educational contexts is to create situations in which people of different ages and expertise interact around common problems, so that older "peers" can be learning and develop along with the children whom they are presumably helping. We call this property of teaching/learning settings "vertical integration." We also subscribe to the idea that development can be promoted by integrating the activity of people of the same age who are institutionally or geographically separated. To this end, our activities integrate support and remedial services of our university with its normal academic program.

Joint University-Community afterschool educational activity centers have been set up that have the desired properties of horizontal and vertical integration, in collaboration with colleagues in the Community Educational Resource and Research Center (CERRC; members of LCHC and members of minority group community organizations concerned about schooling). The activity centers facilitate integration of another kind: between the staff of LCHC and of CERRC, which is staffed by minority group Ph.D.'s with extensive teaching and research experience at the University level.

While CERRC staff acted as on-site mentors, students taking regular classes at UCSD helped to maintain after school computer activities focused on promoting cognitive, affective, and social development. Students carried microprocessors and modems with them from the University to the community. They acted as both role models and helpmates to the children, while the CERRC staff and visiting scholars participating in the activities acted as role models for the students. Constant interaction via computer networks involved not only UCSD students and faculty, but researchers in other states and countries as well. A particularly important finding from this work was that when interacting with children from foreign countries, children have an opportunity to interact not as minority group children, but as Americans—Southern Californians at that— and that artful organization of these joint activities led in many cases to quantum changes in their academic performance in school. No less important was the improved academic performance of UCSD minority group students who distinguished themselves in this work (Diaz, 1984).

## *Joint writing of scholarly reports*

The power of electronic networks to facilitate joint activity among scholars at the university level is illustrated by the collective production of a report to the National Research Council on Science, Technology and Mathematics Education (Cole, Griffin, & LCHC, 1987). The topic of the report was the power of context arrangement within, between, and outside of classrooms as a means of promoting academic excellence, especially for traditionally less powerful minority groups and women. The scope of this topic made it imperative to involve and to integrate experts from many different fields of expertise.

In the first stage, scholars in a number of far-flung geographical locations were contacted, most of them via electronic mail. Those who agreed to participate worked together to arrive at a number of topics and to collect relevant research and theoretical work. Different aspects of the computer medium, including teleconferencing, electronic mail, and an electronic bulletin board were used to speed up the accrual and dissemination of information. Within months, a subset of the group was ready to meet face-to-face, with drafts of proposed subsections

Peg Griffin

Catherine King

which were read and discussed at the working conference. Following these discussions, the group broke up into smaller groups around terminals, to iron out revised versions of each section. In the months that followed this face-to-face meeting, the different subsections were revised, and then linked together to produce a document which not only reported on, but reflected, the role of new technologies in the creation of contexts for learning and creative work.

Among the lessons we learned from this enterprise is that it is possible, using electronic mail supplemented by conferencing structures and face-to-face meetings, to have genuinely representative academic groups work together. The proportions of minority and majority group participants and of men and women were virtually equal. We also found that those people who began to interact through electronic mail later began to see each other more often—quite the opposite result to be expected if computer-mediated interaction was alienating, as some believe.

### *Difficulties*

We would like to close on a cautionary note. Involvement with computer-based networking does require a commitment of time and resources. In the process of allocating the needed resources, we have found it a constant battle to insure that the activities we created did not inadvertently exacerbate the very problems we sought to address. It is easy to be seduced into buying "top of the line" equipment that bars the economically disadvantaged, or to overlook the fact that when minority group communities are far from universities, it may require a long distance call simply to get hooked up, or that local ordinances block seemingly simple innovations. By and large it is our judgment that the advent of computers, including telecommunications via computers, is worsening an already serious problem of social class and ethnic group inequalities. However, that outcome is dictated neither by the technology nor genetics. With sufficient tenacity and cunning, viable, developmentally promising outcomes can be organized.


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Marti tum Suden

## Call For Papers

Papers are invited for a special issue of *Child Development* that will focus on development in minority children (e.g., Afro-American, Hispanic- American, Native American, and Asian-American children). This special issue, to appear in December 1989, will be edited by Margaret Beale Spencer, Division of Educational Studies, Emory University, Atlanta, GA 30322, and Vonnie C. McLoyd, Department of Psychology, 3433 Mason Hall, University of Michigan, Ann Arbor, MI 48109. This issue will encompass diverse areas of development including family and peer relations, social interaction, achievement, the self-system, language, cognition, learning, and health status. Papers that demonstrate relations between these diverse content domains and family processes, peer socialization, ecological contexts outside the home (e.g., the parent's workplace, day-care), and economic conditions are especially welcome. Papers are invited from a variety of disciplines which examine the interaction between individual development and various aspects of the ecosystem (e.g., social policies). All papers should present original research findings. They may focus on a single minority group or subgroup (e.g., Puerto Rican-American children, Mexican-American children) or on comparisons between groups. All papers submitted for inclusion in this special issue will be reviewed through the regular editorial process of the journal. Five copies of each paper must be received by June 30, 1988. Manuscripts should be addressed to Vonnie C. McLoyd at the address above. □