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Collaboration for Colleagueship: A Program in Support of Teachers

Working mathematicians are reaching across organizational boundaries to help make mathematics teaching less isolated, more intellectually invigorating.

Like Saturn's rings,¹ unprofessional working conditions, which teachers confront daily, consist of thousands of tiny grains of dust that appear solid from a distance but that seem to dissolve into pettiness when one moves close enough to initiate change. Isolation in classrooms, lack of even modest resources to use according to one's professional judgment, scarcity of time for extended conversations with colleagues, no permanent study space or access to a telephone, no capacity to delegate administrative details: these are the grains of dust. Taken collectively, they form an impenetrable barrier to professionalism.

The problem of unprofessional working conditions has been treated in the literature, most notably in the pages of this journal over the past few years,² in Ted Sizer's *Horace's Compromise* and John Goodlad's *A Place Called School*, and in a variety of research articles.³ Considerable evidence indicates that teachers as a group receive as much satisfaction from intrinsic rewards as from extrinsic ones, and poor working conditions clearly contribute to the diminution of intrinsic rewards. A recent Harris poll found that after salary complaints, the main sources of job dissatisfaction among teachers were poor working conditions (41 percent); lack of student discipline and motivation (31

Chris de Latour, instructor with the Exploratorium Teacher Institute, assists a teacher from the San Francisco Math Collaborative to complete the Cantenary Arch.



percent); lack of administrative support (25 percent); lack of respect (25 percent); boredom, frustration, burn-out, and stress (22 percent).⁴

The problem of unprofessional working conditions has as an integral part of its solution the development of collaboration among teachers and other like-minded professionals in a community. That is, while collaboration among businesses, universities, and school systems may provide students with new opportunities and schools with new resources, increased acquaintance and collegueship for teachers is usually regarded as a by-product of these collaborations. Professional isolation and lack of parity with other professionals in a community, however, can be eliminated only by extending the range of professionals who work together on projects and tasks of mutual interest.

Building Community through Collaboratives

The Ford Foundation was mindful of these issues when it embarked a year ago on a project to assist a number of cities to develop "mathematics collaboratives"—groups of mathematically minded professionals in a city joined together by bonds of collegueship. This program is small in the overall scheme of things, experimental, and constrained to a particular domain that is of programmatic concern to the foundation: improvement of mathematics teaching in inner-city schools. But it is meant to shed light on some elements of the broader issue of professional working conditions for teachers. It attempts to create conditions of collegueship for teachers with other mathematics-using professionals in a city—by supporting collaborative activities of mathematicians from high schools, higher education institutions, and private industries and thus encouraging the entry of teachers into a larger mathematics community.

The foundation has made grants in seven cities (Philadelphia, Cleveland, Minneapolis, Pittsburgh, Durham, San Francisco, and Los Angeles) in partial support of mathematics collaboratives serving those cities' high school mathematics teachers.⁵ Collaboratives in five additional cities are in their final planning stages, thus completing the projected set of 12. Each collaborative will receive foundation funding for three to five years. Their primary goal is to work with mathematics teachers to determine the conditions under



Members of the Cleveland Collaborative for Mathematics Education attend a quarterly dinner symposium at the Sohio Warrensville Research and Development Center. The symposia bring mathematics teachers and researchers together.

which the teachers would be less isolated from the larger mathematics-using community, more intellectually stimulated, and in a position to participate actively in efforts to improve mathematics education in their schools. Their task then is to create these conditions as much as possible.

- In Los Angeles, the mathematics departments of three high schools have joined with associates from businesses and higher education to identify important projects to improve the mathematics programs in their schools, to identify necessary resources in the community, and to make changes. Joint planning and program development among teachers in a mathematics department and with their business and university associates is the hallmark of this project.

- In Cleveland, high school mathematics teachers have had intense summer exposure, through internships in industry and workshops in industrial retraining centers, to the changing industrial profile of the city and the consequent changes in needed skills for students. Minigrants and a mathematics resource center will provide resources for teachers to use in adapting their schools' mathematics programs to the new environment; their new colleagues from industry will help. Out of this partnership, new and unpredictable additional projects may grow.

- In Minneapolis and St. Paul, an intensive problem-solving seminar in which teachers worked with university mathematicians on complex mathematics problems has renewed teachers' interest in mathematics itself as well as confidence in themselves as *mathematicians* and teachers. A Twin Cities Mathematics Society of school, university, and industrial mathemati-

cians meets regularly to discuss interesting topics in mathematics.

- In San Francisco, mathematics teachers worked with physicists at The Exploratorium, renewing their sense of the power of mathematical modeling to explain physical systems. During the school year they expect to work with physics teaching colleagues on joint projects. The opportunity to develop topics in other scientific disciplines is on the agenda for the future.

Regardless of the mathematics theme that the collaborative has chosen for its initial focus, in each case working mathematicians and mathematics educators from schools, colleges, and universities, community colleges, industries, banks, science museums, and so forth are reaching across organizational boundaries to find mathematical and educational interests in common.

The foundation's program bears a family resemblance to several other networking programs for teachers that have been developed in the past few years: Academic Alliances directed by Claire Gaudiani of the University of Pennsylvania; The Bay Area Mathematics Program directed by Elizabeth Stage of the Lawrence Hall of Science at Berkeley; and the several teacher network projects funded in recent months by the National Science Foundation. It differs from these in offering year-round activity for a substantial portion of a school system's high school mathematics teachers, thereby concentrating resources and energy in a synergistic way.

Program Resources and Replicability

Though they vary in the details, the pilot collaboratives are not costly and have been built largely of components available in many cities—a school year

lecture series, summer internships in industry or academic seminars, a newsletter or electronic mail and message system, a minigrant program for individual teachers and schools, and a governance structure, which teachers will increasingly control. Impact is expected to come from the integration of these elements and the long-term focus on a relatively small group of teachers who share the responsibility for providing mathematics education in their cities.

Since these are pilot projects, we expect that they will make programmatic changes on the basis of experience. Furthermore, the year-to-year patterns of teacher participation will vary from site to site and teacher to teacher. However, at the end of three or four years, we expect that each city will have evolved a relatively stable set of activities and will have developed a sense of the participation that teachers prefer.

In addition to providing partial support for the operation of collaboratives, the foundation is also supporting the Education Development Center in Newton, Massachusetts, to provide technical assistance to the projects—to keep them in touch with developments in the academic and industrial mathematics and mathematics education communities more generally.⁶ The foundation is also supporting researchers at the University of Wisconsin in Madison to document the development of the enterprise and to identify and make publicly available the program elements that seem to work best.⁷ Thus the local projects are not merely developing pilot programs in their own cities but are also contributing to an "idea pool" about desirable—and feasible—modifications in the daily working life of teachers.

Working Lives of Teachers

The outcomes of such an extended program initiative will be complex. In the short run we expect to see teachers in these collaboratives attending more seminars and professional events at a variety of agencies in their cities. In the longer run we expect them to become more enthusiastic about their profession, to ask increasingly interesting questions of their students, to become more receptive to new ideas and suggestions, to become more resourceful in their teaching, and to be more encouraging of their students' efforts to learn. We also expect to learn a great deal about the

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critical variables in a teacher's working career. Even in the first few months that mathematics collaboratives have been functioning, three elements have emerged that appear to be central for the development of a professional milieu for teachers:

1. *time* for teachers to think, to plan, to learn;

2. *resources*—often modest, only a few hundred dollars—but administered in such a way as to provide autonomy for teachers;

3. *colleagueship* with others of like interest.

The development of mathematics collaboratives is an exploration into new modes of professionalism for teachers—professionalism that legitimizes activities other than classroom teaching and encourages collegial interaction among the broader intellectual community in a city. Teachers' need for time to think, to integrate, and to plan may also become more widely recognized as an important component of the profession.

While the project does not deal directly with such issues as desks and telephones, it constitutes a field experiment into the conditions under which mathematics teaching and, by implication, the teaching of other subjects could become a more intellectually invigorating, less isolated endeavor. As each group of teachers in each city works to make the collaborative function well for them, we will all learn more about what modifications need to be made in the daily life of teaching and how they can be accomplished.□

1. I am indebted to Mary Potter Rowe of MIT for the image of Saturn's rings.

2. Recent articles in *Educational Leadership* that treat the problem of unprofessional working conditions for teachers include: Linda Darling-Hammond and Arthur E. Wise, "Teaching Standards or Standardized Teaching?", Vol. 41 (October 1983): 2,

66; Arthur E. Wise and Linda Darling-Hammond, "Teacher Evaluation and Teacher Professionalism," Vol. 42 (December 1984/January 1985): 4, 28; Carl D. Glickman, "The Supervisor's Challenge: Changing the Teacher's Work Environment," Vol. 42 (December 1984/January 1985): 38; Dale Mann, "Impact II and the Problem of Staff Development," Vol. 42 (December 1984/January 1985): 44.

3. See Mark C. Schug, "Teacher Burnout and Professionalism," *Issues in Education* 1, Nos. 2 and 3 (1983) for a review of the literature on this topic.

4. The second "Metropolitan Life Survey of the American Teachers," conducted by Louis Harris & Associates, Inc. As reported in *Education Week*, September 18, 1985, p. 6.

5. The organizations that are conducting the development of mathematics collaboratives in these cities are:

6. Philadelphia: The Franklin Institute (Project Director, Wayne Ransom), 20th and The Parkway, Philadelphia, PA 19103.

7. Cleveland: The Cleveland Education Fund (Project Director, Paula Anderson), 1400 Hanna Building, Cleveland, OH 44115.

8. Minneapolis: School of Mathematics, University of Minnesota (Project Director, Harvey Keynes), 127 Vincent Hall, 206 Church St., S.E., Minneapolis, MI 55455.

9. Pittsburgh: Allegheny Conference on Community Development (Project Director, Leslie Salmon-Cox), 600 Grant St., Pittsburgh, PA 15219.

10. Durham: The North Carolina School of Science and Mathematics (Project Director, J. Keith Brown), P.O. Box 2418, West Club Blvd. and Broad St., Durham, NC 27705.

11. San Francisco: San Francisco Education Fund (Project Director, Gladys Thacher), 1095 Market St., Suite 719, San Francisco, CA 94103.

12. Los Angeles: The Los Angeles Educational Partnership (Project Director, Peggy Funkhouser), 1052 W. Sixth St., Suite 716, Los Angeles, CA 90017.

13. Project Director: Mark Driscoll, Education Development Center, Inc., 55 Chapel St., Newton, MA 02160.

14. Project Director: Thomas A. Romberg, Department of Curriculum and Supervision, University of Wisconsin-Madison, 225 N. Mills St., Madison, WI 53706.

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