

Research on Teaching

JANET EATON

General Math Can Be Improved

The typical general mathematics class, concur interviewed teachers, is academically unmotivated, mathematically disinterested, educationally behind, intellectually limited, and potentially a behavior problem. But it doesn't have to be that way.

Members of the IRT's General Mathematics Project have identified five ways teachers can improve general math classes. Any one of these five "portents of success" will not alone make general math classes substantially better, caution researchers; at least three should be used.

1. *Use social organization to facilitate instruction.* Researchers suggest that teachers think about ways of grouping students that will help them to better learn the material. Students might be placed in small groups and encouraged to work together to ensure that each group member learns a particular math skill or concept. Some award or recognition might be given to the group that makes the greatest improvement.

2. *Increase number and type of opportunities for student response to content.* In most general math classes students respond to the math content mainly through seatwork and tests. Researchers suggest, as one possibility, that teachers might ask several students what answer they got for a problem and write those answers on the board. Then, most important, ask each student *how* he or she got the answer.

3. *Improve quality and quantity of content communication.* In a typical general math class, 10 minutes or less is devoted to presentation and development of math concepts and skills as opposed to 25-35 minutes in a typical algebra class. A general math teacher might, therefore, try to spend more time

on presentation and development. Also, rather than simply telling students the rules for doing a certain kind of problem, a teacher might explain why those rules work.

4. *Decrease instructional disruptions.* Teachers can do this by fine tuning their classroom management skills and thoroughly planning for each class period. Researchers have found that teachers who teach general math and algebra tend to prepare less thoroughly for their general math than for their algebra class.

5. *Modify math content.* General math content is frequently boring. Adding interesting, challenging material (such as measurement, geometry) can help to make general math less tedious. Assigning "work" rather than "labor" is also helpful. Rather than assigning 20 addition problems with positive and negative numbers, a teacher might ask students to think of at least 10 ways to add a positive number and a negative number together to get 15.

For more information, write to Perry Lanier, 201C Erickson Hall, College of Education, Michigan State University, East Lansing, MI 48824-1034. To receive a copy of a reading list of articles pertaining to each of the five "portents of success," send a stamped, self-addressed business envelope to Math Reading List, c/o Janet Eaton, 252 Erickson Hall, College of Education, Michigan State University, East Lansing, MI 48824-1034.

Long-Term Cooperative Learning Works

Cooperative learning can help teachers of heterogeneous classrooms. The Student Team Learning Program of cooperative learning, developed by Robert Slavin of Johns Hopkins University, has positive effects on student achievement, race relations, and self-esteem.

Cooperative learning involves having students work in small (four to six members) heterogeneous teams to master academic material. Heterogeneous is the key word, referring to race, sex, and academic ability. Students earn points for their team based on their improvement scores rather than raw scores, so everyone has an equal chance to con-

tribute to the team score. Slavin says that it is important to promote the idea of equality of ability and to make the students responsible for one another's learning. It is also important that there be team reward or recognition to prevent the students from goofing off.

Fears that the success of cooperative learning was due to novelty and short-term excitement seem unfounded. Findings from the long-term study were similar to those of short-term studies: Cooperative learning promotes positive relationships among students and improves student achievement.

The 17 fourth- and fifth-grade teachers who participated in the study used cooperative learning for language arts, math, and social studies. In some classes, teachers occasionally used cooperative learning for science and reading. The three cooperative learning methods used were STAD (Student Teams-Achievement Divisions), TGT (Teams-Games-Tournament), and Jigsaw II.

Student achievement and attitude toward school improved. The teachers enjoyed using the methods so much that almost all of them continued to use the methods.

For more information see R. E. Slavin and N. L. Karweit, "Cognitive and Affective Outcomes of an Intensive Student Team Learning Experience," *Journal of Experimental Education* 50, 1 (1981): 29-35.

Heterogeneous Classes Need Good Managers

Extremely heterogeneous classrooms may have negative effects on students, but good classroom managers can neutralize those effects. Carolyn Evertson, Julie Sanford, and Edmund Emmer of the Research and Development Center for Teacher Education at the University of Texas at Austin found this in a study of 27 junior high school English classes.

Their results suggest that extreme heterogeneity in students' entering achievement levels in a given class limits the extent to which the teacher can successfully adapt instruction to meet individual students' academic and emotional needs.

However, after the first three weeks of school, teachers who were effective

classroom managers were able to run their classrooms smoothly enough to override most of the negative effects of extreme classroom heterogeneity. Following are the strategies the effective classroom managers used:

1. Special attention and in-class assistance to lower ability students.
2. Limited use of within-class grouping and differentiation of materials or assignments. Except for spelling, for which teachers often grouped students, most teachers only supplemented

whole-class activities with remedial or (to a lesser extent) enrichment materials for certain students.

3. Some differential grading, taking individual student levels and relative progress into consideration when assigning grades.
4. Limited use of peer tutoring.
5. Provision of frequent academic feedback to all students and maintenance of high levels of student accountability for both written work and class participation.

Evertson, Sanford, and Emmer suggest that for teachers of very heterogeneous classes, inservice programs focusing on classroom management would be especially useful and that school districts should place a high priority on helping such teachers improve their classroom management and organizational skills.

For more information, see C. M. Evertson, J. P. Sanford, and E. T. Emmer, "Effects of Class Heterogeneity in Junior High School," *American Educational Research Journal* 18, 2 (1981): 219-232.

Resources

NANCY CARTER MODRAK

Aging Awareness: An Annotated Bibliography. (2nd edition). A 90-page paperback including entries of over 400 articles and books concerned with the relationships between young and old. Available for \$4.25 per copy from Generations Together, 600A Mervis Hall, University of Pittsburgh, Pittsburgh, PA 15260. Phone: (412) 624-5470.

American Education: A Guide to Information Sources. Volume 14 in Gale's American Studies Information Guide Series. A 247-page hardbound bibliographic guide to the theory, practice, and organization of the American school, covering all levels of education. ISBN: 0-8103-1265-4. Available for \$42 from Gale Research Company, Book Tower, Detroit, MI 48226. Contact: Tom Romig. Phone: (313) 961-2242.

Annual Summary of Investigations Relating to Reading. A 247-page summary of approximately 850 reports of reading research published between July 1980 and June 1981 in 350 journals. Covers six major categories and includes a description of the research and findings. IRA Book No. 950. Available, prepaid, for \$7.00 to IRA members, \$10.00 to others, from International Reading Association, 800 Barksdale Rd., P.O. Box 8139, Newark, DE 19711. Phone: (302) 731-1600.

Bilingual Special Education Resource Guide. A 200-page hardback dealing with issues involved in educating bilingual special education students and sources of information, edited by Carol H. Thomas and James L. Thomas. ISBN: 0-89774-008-4. Available for \$25.00 from The Oryx Press, 2214 N. Central at Encanto, Phoenix, AZ 85004. Phone: (602) 254-6156.

The Middle Level Principalship. Volume I: A Survey of Middle Level Principals and Programs. A 150-page paperback; takes a comprehensive look at intermediate, middle, and junior high school principals and programs. Available for \$7.00 per copy, discounts given for multiple orders. Contact the National Association of Secondary School Principals, 1904 Association Dr., Reston, VA 22091. Phone: (703) 860-0200.

Mini-Libraries on Career Education. Four levels of career education materials (K-3, 4-6, 7-9, and 10-12) divided into math, science, guidance, language arts, and social studies categories. Each mini-library contains approximately 2,600 pages of ideas, strategies, practices, activities, and methods of infusing career education into the learning environment. For more information, contact the National Center for Career Education, Building T316, Fort Missoula, Missoula, MT 59801. Phone: (406) 243-2989.

Planning a Learning Laboratory. Kit offering advice on acoustics and electri-

cal requirements, and layout for learning laboratories. Includes grids and cut-outs of furniture and equipment for planning optimum room arrangements. Available free of charge from Tandberg of America, Labriola Ct., Armonk, NY 10504. Phone: 1-800-431-2430 or (914) 273-9150.

1982-83 Computer Directory for Schools. A 200-page buyer's guide to the selection of microcomputers and peripherals, courseware, computer-assisted and computer-managed instruction systems, books and resources, magazines and journals, and free materials. Copies are available from *Instructor* magazine, Dept. JC, 757 Third Ave., New York, NY 10017. Phone: (212) 888-3064.

1982 Bibliography on Home Study Education. Includes entries of over 200 books of interest to home study educators in six categories including nontraditional and continuing education and adult and vocational education. Copies may be purchased for \$3.00 each from the National Home Study Council, 1601 18th St., N.W., Washington, DC 20009. Phone: (202) 234-5100.

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