

Research Series No. 61

A SURVEY OF PLACEMENT POLICIES  
FOR NINTH-GRADE MATHEMATICS

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Published By

The Institute for Research on Teaching  
252 Erickson Hall  
Michigan State University  
East Lansing, Michigan 48824

October 1979

This work is sponsored in part by the Institute for Research on Teaching, College of Education, Michigan State University. The Institute for Research on Teaching is funded primarily by the Program for Teaching and Instruction of the National Institute of Education, United States Department of Health, Education, and Welfare. The opinions expressed in this publication do not necessarily reflect the position, policy, or endorsement of the National Institute of Education. (Contract No. 400-76-0073)

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### Abstract

A survey of ninth-grade math student placement policies in Michigan secondary schools was conducted. Two central questions were: (1) Who makes the placement decision? and (2) What are the most frequently used criteria in making that decision? Two-hundred Michigan secondary schools were selected at random and questionnaires were sent to chairpersons of their mathematics departments. Based on responses from 121 schools, the results indicate that teachers' and counselors' recommendations carry the most weight in the placement decision and that little importance seems to be given to any type of standardized test information.

A Survey of Placement Policies  
for Ninth-Grade Mathematics

Gabriella Belli<sup>1</sup>

General Mathematics<sup>2</sup> is generally disliked both by teachers and pupils (Baumann & Carter, 1976; Dodes, 1967; Shulte, 1970). Ballew (1974) states that general math courses "share with each other a low level of esteem (and) are looked down upon by students, teachers, parents, and administrators in most schools" (p. 101).

Students dislike being in general math classes because it marks them as less intelligent than their peers in algebra classes. House (1975) contends that

The course in which a student is enrolled may be related to his perception of the evaluation that others hold for him. This is especially likely in mathematics classes, where enrollment in algebra is commonly assumed to imply that the student has the potential to succeed in college preparatory mathematics courses. Enrollment in non-algebra courses generally carries the opposite connotation. (p. 246)

Students, parents, and teachers generally assume that if students are enrolled in a general mathematics course, they are incapable of success at the college level.

A nation-wide survey of high-school students' perceptions of their math teachers supported the claim that "Students' attitudes and learnings

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<sup>1</sup>Gabriella Belli, formerly a research intern with IRT's General Mathematics Project, is now an intern with the Content Determinants Program.

<sup>2</sup>The term "general mathematics" is used here to indicate any ninth-grade non-algebra course. This would include courses entitled Basic Math, Remedial Math, Fundamentals, Applied Math, Pre-Algebra, and the like. Although their titles and their contents vary, their students all evidence similar problems: low math ability, poor motivation, and a general dislike for mathematics.

are directly influenced by the personal qualities of teachers and by the classroom climate they create" (Cooper & Petrosky, 1976, p. 227). Discussions with teachers about their general math classes indicate feelings of frustration and perceived difficulty in managing and teaching such classes. In two massive reviews of research in the area of attitudes and achievement in mathematics, Aiken (1970, 1976) concludes that the results point to a definite correlation between teachers' attitudes and students' attitudes and achievement.

Research on teacher expectancies has resulted in two rival hypotheses to explain that correlation: (1) differential teacher expectations influence teacher behavior, which in turn produces student behavior in accord with initial expectations (Brophy & Good, 1970); and (2) student achievement influences teacher expectations and behavior (Dusek & O'Connell, 1973; West & Anderson, 1976). In a substudy of the Beginning Teacher Evaluation Study aimed at answering the question "Do teacher expectations produce differential academic growth?" this was reported:

The findings suggest that although self-induced teacher expectations are generally well founded, and not negatively biased against minority students, males or females, when teachers hold higher versus lower expectations for similar average students, the difference in the subsequent achievement can be as much as one standard deviation apart. (Lockheed, Note 1)

Students typically enter general mathematics classes with pre-established low levels of achievement, and teachers' initial expectations for them are low. Thus, regardless of which hypothesis is more accurate, the resulting environment is not conducive to student success.

#### A Survey of Placement Policies

During the past year, researchers with IRT's General Mathematics Project have been studying several general mathematics classes. Students

in these classes had low math ability, poor motivation, and a general dislike for mathematics. We were especially interested in how these students were placed in general math, in view of the research indicating that placement of students in classes of varying ability may be functionally related to their success or failure (Esposito, 1973; Flowers, 1966; Tuckman & Bierman, Note 2).

To better understand one aspect of this situation and to help provide direction for future work, a survey of ninth-grade math student placement policies in Michigan secondary schools was conducted. Two central questions were: (1) Who makes the placement decision? and (2) What are the most frequently used criteria in making that decision? The survey also attempted to document the relative frequency of algebra versus non-algebra courses, the proportions of students in each type of course, and the proportion of schools having mathematics course requirements for the college and non-college bound student.

Two hundred Michigan secondary schools were selected at random and questionnaires were sent to chairpersons of their mathematics departments. Responses were received from 121 schools (60.5%). The schools were classified into three groups according to size, and the returns were almost equal across the three groups:<sup>3</sup>

<u>Size Category</u>	<u>Enrollment</u>	<u>Number of Returns</u>
small	100-500	44
medium	501-1000	42
large	1001-3000	32

Three schools did not provide information regarding total enrollment.

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<sup>3</sup> Chi-square analyses indicated that there was a significant relationship between school size and only one of the variables examined: school policies on math requirements for college-bound students.

### Criteria for Placement Decisions

In the survey, chairpersons were asked to rate the frequency of use of nine criteria for making the placement decision. These criteria were chosen to reflect four main areas of potential input to the decision: (1) math pretests, (2) teachers' or counselors' recommendations, (3) parents' or students' requests, and (4) grades. Each one could be rated on a five-point scale indicating extent of use from "always" to "never". Table 1 shows percentages (based on 120 schools) across the five categories for each of the criteria.

Table 1

#### Frequency of Use for Placement Criteria

	<u>Always</u>	<u>Frequently</u>	<u>Sometimes</u>	<u>Seldom</u>	<u>Never</u>
MATH TESTS:					
school designed placement	15.8	12.5	13.3	5.8	52.5
standardized achievement	20.0	16.7	21.7	9.2	32.5
diagnostic	10.8	18.3	24.2	5.8	40.8
RECOMMENDATIONS:					
counselors	24.2	32.5	17.5	5.0	20.8
8th-grade teachers	56.7	34.2	5.8	1.7	1.7
REQUESTS:					
parents	13.3	23.3	44.2	12.5	6.7
students	12.5	31.7	34.2	10.0	11.7
GRADES:					
8th-grade mathematics	29.2	42.5	14.2	1.7	12.5
8th-grade G.P.A.(all sub- jects)	1.7	12.5	24.2	17.5	44.2

Examination of the "always" rating provides an indication of the most important criterion and shows that teachers' recommendations are always used in more than half the schools surveyed. Note that teachers' recommendations fall in second place among criteria used frequently, behind eighth-grade math scores and slightly ahead of counselors' recommenda-

tions. Of interest is the fact that criteria never used by many of the schools are the three types of math test (school designed placement tests, standardized achievement tests, and diagnostic tests). The only other criterion never used in a large portion of the schools was the student's overall grade point average for eighth grade.

To find out the relative weight allotted each of the various placement criteria, chairpersons were asked to rank order them (see Table 2).

Table 2

Rankings of Placement Criteria  
by Importance to Placement Decision

	Median Rank	Percentages		
		Ranked first	Ranked second	Not ranked
School placement test score	5.0	6.6	7.4	62.8
Standardized Achievement scores	3.8	13.2	8.3	38.0
Math diagnostic test scores	3.6	11.6	9.9	43.0
8th-grade teachers' recommendations	1.4	50.4	27.3	5.8
Counselors' recommendations	2.9	11.6	19.0	28.9
Parent requests	3.9	7.4	15.7	19.8
Student requests	3.5	13.2	16.5	20.7
8th-grade math scores	2.7	9.9	26.4	19.0

As can be seen, the highest percentage of both first and second ranks go to teachers' recommendations (50.4% and 27.3%, respectively). Each of the other criteria are ranked in first place less than 15% of the time.

The results from the placement criteria ranking and the frequency of their use are consistent with each other. Both indicate that of all criteria surveyed, teachers' and counselors' recommendations carry the most weight in the placement decision, followed by eighth-grade math scores; little importance was placed on other forms of test scores.



Perhaps the fact that teachers' opinions are so highly regarded results in a similar regard for the eighth-grade math scores, since it is the teachers who provide them. And, since counselors help students to select appropriate study programs, it follows that their opinions and recommendations would also be highly ranked.

#### Decision Makers

Although teachers' recommendations are considered the single most important variable in the student placement decision, teachers are not primarily responsible for the final decision. Table 3 presents the percentage of times each of seven individuals was rated as being involved in the final decision. These percentages are based on 115 schools and include both individual responsibility and joint involvement in the decision-making process.

Table 3  
Involvement in Placement Decisions

<u>Decision Maker</u>	<u>Percentage of Times Involved</u>
Counselor	40.0
Principal	32.2
Teacher	31.3
Student	17.4
Chairperson of Math Department	15.7
Parent	7.8
Assistant Principal	5.2

Although no consistent pattern for joint decisions emerges, the data indicate that the teacher and counselor are most often involved. Usually students follow the recommendations made for course selection, but in many schools either the student or the parent may override the school's decision. Perhaps the reason principals are rated so highly is that, in case of a dispute, they have the final authority.

### Course Offerings

An analysis of the types of mathematics course offered at the ninth-grade level indicates that Algebra I is offered in the greatest number of schools (99.2%), with general mathematics falling in second place (63.3%). Table 4 gives the number and percentage of schools offering each of 10 courses (percentages are based on 120 schools).

Table 4  
Course Offerings

<u>Course</u>	<u>Percentage of Schools Offering Course</u>	<u>Number of Schools Offering Course</u>
Algebra I	99.2	119
General Math	63.3	76
Geometry	48.3	58
Pre & Elem. Alg.	47.5	48
Algebra II	40.4	48
Remedial Math	35.8	43
Basic Math	35.8	43
Business Math	26.7	32
Consumer Math	18.3	22
Applied Math	8.3	10

Since the distinctions among some of these course titles is vague, two aggregated categories were formed. The broad term "general mathematics" was used to include general math, remedial math, and basic math. The term "vocational mathematics" was used to include business math, consumer math, and applied math. When considered according to these categories, the percentage of schools offering one or more of the general math courses grows to 88.6% (106 schools), and those offering vocational math courses increases to 43.3% (52 schools). Although algebra I courses are offered by a higher percentage of schools than general or vocational math are, the need for so many non-algebra math courses at the secondary level warrants concern and study.

It would be useful to consider the actual number of ninth-grade students who are in these various courses. Unfortunately, the majority of the respondents failed to provide enrollment figures broken down by course. Based on the schools that did provide information, an average of 43% of ninth-grade students are in algebra I courses (based on 95 schools) and 38% are in general math courses (based on 66 schools).

Osterndorf and Horn (1976) report that according to a national survey of public secondary schools conducted in 1972-73, remedial math had a considerable enrollment and approximately 40% of the California and Georgia schools offered remedial math in grades 9-12. They also reported that general mathematics was available in 83.2% of the schools having grades 9-12, with 65% of these offering it at grade 9. Enrollments in both advanced and elementary general math courses was 14.7% of total school enrollments. The percentage of ninth-grade students enrolled was not provided. They stated that this course was to serve students who were not going to college and needed to fulfill a one-year math requirement.

### Required Math

The final information requested concerned school policies on mathematics requirements for college and non-college bound students. Of the 117 schools that responded to these questions, slightly more than half (54%) have requirements for college bound students. A chi-square analysis of the degree to which this requirement and school size are related proved to be significant ( $p < .04$ ). Of the schools having such requirements, most were in the medium size category (45%), with the rest almost equally split between small and large schools. Within the large schools, there was an even split between those that required courses (50%) and those that did not (50%). For small schools, the split was close to half (43% did, 57% did not). However, in medium size schools, 70% required specific math courses for the college bound.

Overall, more schools had requirements for non-college bound students (over 60%) than for college-bound students. Typically, non-college bound students were required to take at least one year of any math course. While most of the schools requiring some math for these students were also of medium size, the relationship between this variable and school size was not significant.

### Conclusion

The results of this survey indicate that primary responsibility for student placement in ninth-grade math classes rests on teachers and counselors. Given the potential damage a wrong decision can do, we should examine further how teachers and counselors assess students. This is particularly important since standardized test results are not often used.

This questionnaire was completed by chairpersons of mathematics departments, and it is possible that they are only partially aware of the

placement process. For example, perhaps teachers and counselors use standardized test results to assess pupils and math chairpersons are not aware of this. Counselors in large schools may not have the opportunity to know all the students. Therefore, it seems reasonable that they rely on standardized test results. Further study of the ninth-grade math placement decision should take such issues into consideration.

The following questions are being posed as a potential follow-up to the present study: (1) On what basis do teachers and counselors make placement decisions? (2) How objective or subjective are these decisions? (3) How accurate are the decisions now made in correctly placing students? Answers to these questions may help in determining the validity of current practices or, possibly, in improving them.

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